UNIVERSITY OF ALBERTA

Reading Fluency:

A Definitional and Intervention Critique of the Research Literature

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF EDUCATION

DEPARTMENT OF ELEMENTARY EDUCATION

EDMONTON, ALBERTA

SPRING 2008

Library and
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395 Wellington Street
Ottawa ON K1A 0N4
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Bibliothèque et
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Direction du
Patrimoine de l'édition

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file Votre référence
ISBN: 978-0-494-45758-0
Our file Notre référence
ISBN: 978-0-494-45758-0

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ABSTRACT

The purpose of this thesis was to provide a critique of the theoretical construct, reading fluency through a systematic analysis and synthesis of the literature between 1980 and 2007 inclusive on the definitional and intervention research of the term. This critique was undertaken in order to establish a more consistent and complete understanding of reading fluency, the dimensions of reading fluency, and the reasons reading fluency is such an elusive construct. No unified perspective on what comprises reading fluency was evident. Although several dimensions of reading fluency are identified in the literature including: reading rate, word accuracy or decoding, automaticity, and prosody, it is unclear which of these dimensions contribute to reading fluency and which are a by-product of reading fluency. Consequently, I question whether the construct of reading fluency is sufficiently unique to necessitate a discrete theoretical concept. Moreover, I argue that the definitional and intervention research on reading fluency does not provide sufficient evidence to distinguish the goal and dimensions of reading fluency as separate and distinct from skilled, proficient reading. Concluding comments coupled with suggestions for future research on how reading fluency and proficient reading develop over time and whether the two are sufficiently different theoretical constructs are provided.

ACKNOWLEDGEMENTS

Completion of my thesis represents a major step in my professional and academic experience as a special education teacher and consultant, and my recent induction into the world of academia as a graduate student and budding researcher. It is with a deep sense of pride and gratitude that I acknowledge the significant people who provided thoughtful feedback and support which helped to sustain me as I worked to achieve this goal. First and foremost, I am extremely grateful for the opportunity to work with my supervisor, Dr. Linda Phillips, who defines the essence of teacher and researcher, mentor, and guide. I have been awestruck by her dedication, commitment, patience, and generosity of her time and expertise. Her high expectations and standards have challenged my thinking, encouraged me to maximize my potential, and helped me to achieve more than I ever imagined. I thank Dr. Jill McClay for her generous support and encouragement throughout my Master of Education program and for her willingness to serve on my thesis committee. She has been my touchstone since my first graduate class at the University of Alberta in July 2005. I express sincere gratitude to Dr. Lynn McQuarrie, my external examiner, whose careful scrutiny of my thesis and thought-provoking questions challenged me to think deeply about my beliefs and perspectives on reading and reading fluency. And finally, to my family and friends who expressed genuine interest in my work and provided encouragement and support throughout the research and writing process. I gratefully acknowledge my dear friend and colleague, Diane Gagley, who shares my passion and love for language and literacy and inspires me to pursue my goals.

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CHAPTER 1: INTRODUCTION

Preventing reading difficulties is a matter of considerable concern in education. Two fundamental issues: (a) the lack of precise definitions for some of the fundamental skills and abilities that constitute proficient reading, and (b) the lack of research evidence to support intervention/prevention programs have not been addressed in the reading literature. These issues have potentially serious consequences for the valid and accurate identification of children experiencing reading difficulties and for effective intervention. This thesis is a critique of the theoretical construct, reading fluency.

Background and Theoretical Framework

School failure is considered one of Canada's most pressing educational challenges with projections as high as 40% of children experiencing problems with reading (Lee & Burkham, 2002). It is widely accepted that students who struggle to learn to read have significant difficulties in phonological awareness and word-reading skills (Torgesen et al., 2001). These skills play an important role in the development of reading fluency, both at the word- and text-level. Chard, Vaughn and Tyler (2002) reported "[s]tudents with learning or reading disabilities demonstrate difficulties in the area of fluency. A common core problem is the ability to read sight words, decode words, and read phrases and sentences automatically and rapidly" (p. 387). In 1983 Richard Allington stated that reading fluency was the "most neglected reading skill" (p. 556).

Despite the frequency with which the term, reading fluency, appears in the reading and intervention literature, there is a lack of agreement on both its definition and constitutive aspects. The meaning of the term varies depending on the context, purpose and frame of reference for the research. Kame'enui and Simmons (2001) stated,

"…reading fluency as a construct does not enjoy definitional, theoretical, empirical, or instructional consensus in the research literature…reading fluency is eonomine; that is, it is a term so broad and unsatisfactory in meaning that little insight and understanding are gained beyond the mere use of the term" (p. 204). Wolf and Katzir-Cohen (2001) reported, "…there are still no consensual definitions of what is meant by fluency and what its relation might be to the subset of time-related terms most frequently related to it (e.g., automaticity, speed of processing, reading rate/speed, and word recognition rate/proficiency)" (p. 213).

Moroever, a leading publication from the International Reading Association (IRA) titled, *What Research Has to Say About Fluency Instruction* (Samuels & Farstrup, 2006) underscores the renewed interest and emphasis on reading fluency. The editors highlighted two critical issues related to reading fluency, "… how one defines fluency and how one assesses it. The two problems are intertwined because how one defines fluency influences how it will be measured. Measurement is an important issue because of the controversy and concern about the validity of some of the methods that are widely used to measure fluency. As you read the chapters in this book that address some of these problems, you will have to decide for yourself which definitions and which approaches to assessing fluency make sense and which ones do not" (p. 2). Hence, the lack of clarity that persists in the field is troubling.

Many intervention studies have utilized intensive, systematic, and explicit phonologically-based methods to address the word-level reading deficits exhibited by children (Blachman et al., 2004; Denton, Fletcher, Anthony, & Frances, 2006; Mathes et al., 2005). Although many of these studies have reported improvements in phonological

processing and awareness, as well as word and nonword reading accuracy, there has been an apparent lack of generalization of these skills to overall reading fluency. In an extensive review by the National Institute of Child Health and Human Development (NICHD), Lyon and Moats (1997) called for intervention research to examine the elusive construct of reading fluency, "It is also critical to recognize that in all of the NICHD intervention studies, improvements in decoding and word-reading accuracy have been far easier to obtain than improvements in reading fluency and automaticity. This persistent finding indicates there is much to learn about the development of componential reading skills and how such skills mediate reading rate and reading comprehension" (p. 579). Furthermore, the uni-dimensional improvements in decoding and word-reading accuracy do not translate into improved reading fluency or reading comprehension. Wolf and Katzir-Cohen (2001) also underscore the need for more systematic study of reading fluency,

> …there must be a greater concentration of effort (a) in defining what we mean by fluency, (b) in charting the development of its component structure, (c) in understanding the breadth and nature of processing-speed and fluency deficits in reading subtypes, and (d) in applying this knowledge to the development of intervention programs…efforts toward gaining greater clarity about fluency will push forward not only our understanding of the component structure of reading fluency, but also the development of better assessment tools and more comprehensive interventions" (pp. 212-213).

In summary, despite the fact that there is substantial agreement among researchers that reading fluency is an important construct of overall reading achievement, the on-

going debate centers around a number of unresolved issues including what constitutes the fundamental features of reading fluency; the relative importance of reading fluency in relation to the various stages of reading development; and how and what aspects of reading fluency should be measured.

Statement of the Problem

The vexing, unanswered question is why interventions have consistently resulted in insignificant and negligible effects on reading fluency. In an attempt to answer the aforementioned question, I turned to examine systematically how reading fluency is defined and conceptualized in the reading research literature. The term reading fluency is used in a variety of contexts for a number of different purposes. In some cases, the term is used in relation to word-level fluency and at other times, it is used in reference to text-level fluency. However, it is not always evident which interpretation of the term is being applied. An exploratory examination of the intervention studies revealed a pervasive lack of consensus and understanding in the field about the construct of reading fluency and what role it plays in the development of proficient reading skills.

Purpose of the Research

Building on my expertise as a special education teacher and reading consultant, the objective of this research is to conduct a thorough and systematic review of the research literature on the definitions of reading fluency as well as experimental studies of reading fluency in order to lay the foundation for a theoretical framework that answers questions such as: (a) How is reading fluency defined and conceptualized in the reading and intervention research literature? (b) What is it that is so unique about reading

fluency? (c) What does it mean to read fluently? The significance of the answers to these questions lies in advancing understanding of the relationship between reading fluency and reading rate, word accuracy, automaticity, prosody, and comprehension as well as to bridge the gap between research and practice.

Definition of Terms

There are a number of specific terms used in the research literature on reading fluency which are defined here for purposes of clarity.

Assisted reading – an instructional approach that provides opportunities to practice reading connected text with "a direct model of fluent reading for the learner in the form of a mentor, a taped recording of the text, or another form of speech feedback" (Kuhn & Stahl, 2000, p. 10).

Automaticity – "fluent processing of information that requires little effort or no attention, as sight-word recognition" (Harris & Hodges, 1995, p. 16).

Continuous reading – a strategy designed to increase the amount of sustained reading of a range of connected text.

Learning disability - "refers to a number of disorders which may affect the acquisition, organization, retention, understanding or use of verbal or nonverbal information" (Learning Disabilities Association of Canada, 2002).

Prosody - "(1) the pitch, loudness, tempo, and rhythm patterns of spoken language; suprasegmental prosodic features; (2) the study of the form and metrical structure of verse" (Harris & Hodges, 1995, p. 196).

Reading comprehension – "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language. It

consists of three elements: the reader, the text, and the activity or purpose for reading" (p. 11). The goal being understanding and grasping the meaning of text (Kirby, 2007; Phillips et al., 2007).

Reading disability - (1) reading achievement that is significantly below expectancy for both an individual's reading potential and for chronological age or grade level, sometimes also disparate with a person's cultural, linguistic, and educational experiences; (2) reading achievement significantly below what could reasonably be expected of a person; a marked ability-achievement discrepancy" (Harris & Hodges, 1995, p. 210).

Reading fluency intervention – any instructional approach designed to increase students' reading fluency of connected text (Chard, Vaughn, & Tyler, 2002).

Reading proficiency - the quick, efficient and complete comprehension and interpretation of print.

Reading rate - "how fast a person reads, usually silently; reading speed" (Harris & Hodges, 1995, p. 202); reading rate involves the "fluent identification of individual words and the speed and fluidity with which a reader moves through connected text" (Torgesen & Hudson, 2006, p. 132).

Repeated reading – The process of rereading a passage of connected text for a pre-specified number of readings or until a certain performance criterion is reached (Samuels, 1979, p. 404).

Unassisted repeated reading - independent reading practice which involves rereading a meaningful text in which no model or prototype is used until "oral production is fluid, flowing, and facile" (Dowhower, 1989, p. 504).

Word accuracy – "the ability to recognize or decode words correctly" (Torgesen & Hudson, 2006, p. 133); "(1) the process of determining the pronunciation and some degree of meaning of a word in written or printed form; (2) the quick and easy identification of the form, pronunciation, and appropriate meaning of a word previously met in print or writing" (Harris & Hodges, 1995, p. 283).

Overview of Chapter Organization

The thesis is organized into five chapters. Chapter 2 presents a description of the methodology adopted to identify, categorize, analyze, and synthesize the relevant research literature on the construct of reading fluency. The review and analysis of the range of definitions of reading fluency is the subject of Chapter 3. Chapter 4 provides an examination of reading intervention research focused on the improvement of reading fluency followed by a discussion of how reading fluency is defined and conceptualized in the field with limitations and implications for future research making up Chapter 5.

CHAPTER 2: RESEARCH METHODOLOGY

A critique of the reading fluency research was undertaken in accord with the six steps described as follows.

Identification of Research Sources

Step one involved a thorough and systematic search of all relevant sources, the identification of specific vocabulary dealing with reading fluency, and the initial mapping of all citations on reading fluency (Hart, 2000). A computer search of the CBCA Ed, Education Ed. Journals (Proquest), ERIC, Sage Fulltext Collections, Psych Info, Academic Search Premier, and Web of Science databases was completed to identify a broad range of research using the following combinations of descriptors: *reading fluency* paired with *accuracy, decoding, word recognition, reading rate, automaticity, prosody, silent reading, oral reading, comprehension, assessment, evaluation, reading instruction, reading intervention, repeated reading, assisted reading,* and *unassisted reading.* In addition, I conducted an ancestral search from the reference lists of relevant journal articles and book chapters to locate additional literature not identified in the initial computer search. With Allington's (1983) claim about the neglect of reading fluency in mind, I limited my search to studies between 1980 and 2007 inclusive, in order to trace the conceptualization of reading fluency over time. The pool of relevant literature comprised of a total of 127 studies including 90 journal articles, 31 book chapters, five technical reports, and four dissertations. Of these, 17 journal articles, seven book chapters, and one United States government report were deemed relevant for the definitional aspect and five review articles and two intervention studies were deemed relevant for the intervention aspect of this study. Research deemed relevant included any

peer-reviewed journal article or book chapter that provided an explicit definition of reading fluency. For the intervention research, these criteria were extended to include empirical studies of interventions that targeted the improvement of reading fluency. The five review articles were deemed relevant on the premise that the reviews had examined and evaluated a large body of peer-reviewed research in leading journals and with major academic publishers on interventions for reading fluency and thus met the selection criteria.

Classification of Types of Research

Step two required the classification of the types of research identified and collected under step one into explanatory, exploratory, or descriptive studies on the use(s) of reading fluency. The body of literature was examined and reviewed in several phases.

The first phase of examination and review required the identification of the standards and conventions within each discipline (reading, special education, cognitive psychology). The next phase required the specification of the design features (purpose, scope, focus, sampling, type of data, validity, etc.). In the third phase, a template was used to record the pertinent details of the studies to ensure consistency. Next, the studies were sorted by topic or theme into the following categories: conceptualization of reading fluency; reading rate; prosody; accuracy; automaticity; comprehension; intervention research; instructional strategies and approaches; policy; and assessment. Given the focus of my research, I culled the literature and selected research based on two criteria: (1) the study provided a definition and/or conceptual framework for reading fluency, and (2) the study focused on interventions designed to improve reading fluency.

Examination of Definitions of Reading Fluency

Step three required an analysis and evaluation of claims made within each study identified. In the first phase of the literature review, I examined the literature to identify specifically how reading fluency was defined and conceptualized. Twenty-five separate definitions, or descriptions, of reading fluency from peer-reviewed journal articles and book chapters were examined in chronological order. The definitions and/or descriptions of reading fluency were compiled into two tables designated by two separate blocks of time: Table 1 from 1981 to 1999; and Table 2 from 2000 to 2007, inclusive.

Examination of Intervention Studies on Reading Fluency

In the second phase of my literature review, I focused specifically on five review articles of intervention research on reading fluency published in peer-reviewed journals between 1999 and 2004 (Chard, Vaughn, & Tyler, 2002; Kuhn & Stahl, 2003; Meyer & Felton, 1999; NICHD, 2000; Therrien, 2004). The reviews offered a comprehensive survey, description, interpretation, and analysis of 93 unique reading fluency intervention studies between 1970 and 2000. This literature was fundamental to my critique as these reviews encompassed a large body of research on reading fluency interventions for students from grades two to 12 and they also provided important comparisons and evaluations of reading interventions in relation to theories of reading and fluency development. For purposes of thoroughness, I searched and reviewed two additional intervention studies published since the last review article in 2004. I used a systematic procedure and protocol for recording and coding the intervention research based on the following criteria: (a) purpose of the study, (b) research design, (c) participant information, (d) sample size, (e) description of the intervention including information

about the comparison and treatment groups, (f) definitions of reading fluency or the dimensions of reading fluency examined in the study, (g) dependent measures of reading fluency and other skills evaluated in the study, (h) results and discussion of the study, and (i) conclusions.

Comparative Data Analysis

Step four organized the review through repeated comparisons and contrasts of the literature in order to identify areas of difference and similarity in data, methodology, and epistemology. In the first phase of step four, the definitions/descriptions of reading fluency were analyzed based on the specific dimensions of fluency that were emphasized including reading rate; word accuracy or decoding; automaticity (implicit or explicit); prosody; and comprehension. During the second phase of step four, I examined the five review articles on reading fluency interventions in chronological order to compare the intervention studies for similarities and differences on several levels including: the definitions or conceptualization of reading fluency; the treatment and control conditions; the measures of reading fluency; and the findings and conclusions about whether the interventions led to gains in reading fluency. The reviews were examined to determine overlap of intervention studies. I conducted a comparative analysis of the findings from each of the reviews to identify new insights or additional information offered towards the conceptualization of reading fluency. During this phase, I evaluated the methodological rigor of each study within its own paradigm according to the following criteria: experimental research design with treatment and comparison group, description of sample (size and demographics), specification of measures used, duration of treatment, consistency and coherence of findings and interpretations, and logical coherence between

the conclusions, results, and purpose of each study. Memos and notes were recorded throughout the inquiry process to grapple with and make sense of the data. This phase was comprised of a continuous process of reflection and analysis (Krathwohl, 1993).

Data Mapping

Step five moved to mapping the information collected and analyzed into at least six categories: author/date; questions/concerns; materials/evidence; argument; concepts/form of analysis; and main sources. This step involved the merging and integration of the definitions of reading fluency with the intervention research in order to advance how reading fluency is conceptualized in the reading research. Mapping the research provided a framework for converging and/or discrepant evidence to emerge in order to establish an integrated perspective of reading fluency (Denizon & Lincoln, 2000).

Data Integration and Written Composition

The *sixth and final step* was the integration of the available and relevant research literature pertinent to my thesis. The process of writing the thesis was both inductive and iterative. I considered all aspects of the research evidence in order to establish a sense of the broader and more general emerging themes. During this phase, I cycled back and forth between data collection and analysis, interpretation and re-interpretation of the research evidence and findings, in order to construct a consolidated picture for my conclusions. Based on extensive analyses, I constructed a narrative discussion to explain what I found in response to my research questions, the limitations of the research, and suggestions for future research. Throughout the review process, I consulted with my

supervisor in order to produce a critique of the theoretical construct on reading fluency that was thorough, systematic and fair.

CHAPTER 3: READING FLUENCY DEFINITIONS

The focus on reading fluency is currently gaining momentum in the field of reading research. Wolf and Katzir-Cohen (2001) explained, "the history of fluency research in the field of reading might best be characterized as intellectually spasmodic: There are periods of great effort and creativity, followed by fallow periods of relative disinterest" (p. 211). Over two decades ago, reading fluency was relatively disregarded as an important aspect of overall reading development. Anderson (1981) suggested that fluent oral reading practice was "the missing ingredient" in traditional skill-based reading instruction and around the same time, Allington (1983) characterized reading fluency as the "most neglected reading skill" (p. 556).

The prescient claims would not take hold for about a quarter of a century. Pikulski and Chard (2005) emphasized the important, inseparable relationship between fluency and comprehension, "while the construct of fluency might have been neglected in the past, it is receiving much-deserved attention presently. A very strong research and theoretical base indicates that while fluency in and of itself is not sufficient to ensure high levels of reading achievement, fluency is absolutely necessary for that achievement because it depends upon and typically reflects comprehension" (p. 517). Although there is consensus that reading fluency is an essential component of reading, the on-going debate centers around what constitutes reading fluency, its importance in relation to the various stages of reading development, and how, and what aspects of reading fluency should be measured.

The focus of this chapter is to present a comprehensive review and analysis of the definitions of reading fluency to illustrate the variability of usage currently represented in

the literature. The body of literature on reading fluency includes a wide-range of theoretical, conceptual, and empirical research focused on the components that comprise reading fluency, the developmental progression of reading fluency, and the evidence-based instructional approaches for promoting reading fluency. The subsequent review of definitions has been organized into two sections: (1) an analysis of the definitions of reading fluency from 1981 to 1999 inclusive, and (2) an analysis of definitions from 2000 to 2006 inclusive because 2000 marked a difference in definitions.

Table 1 includes a compilation of five definitions/descriptions of reading fluency and of oral reading fluency found in the reading literature between 1981 and 1999 inclusive. Each definition mentions one to three characteristics of reading fluency with no distinct pattern of consistency across and within the definitions. Harris and Hodges (1981, 1995) proposed two definitions of reading fluency during this period of time which focused on the importance of word recognition. However, the earlier definition addressed only oral reading whereas the later raised the additional context of silent reading. The implication of the language used by Harris and Hodges in the 1995 definition is that the lack of reading fluency "might hinder comprehension in silent reading or the expression of ideas in oral reading" (p. 85). This wording suggests a difference of focus depending upon whether reading is oral (expression) or silent (comprehension). The inclusion of the second level of definition, automaticity does not seem to add clarity as will be discussed in a subsequent section. In addition, two definitions included phrases like "effortless" and "automatic" reading which indicated that automaticity was treated as a central feature of oral reading fluency (Meyer & Felton, 1999; Zutell & Rasinski, 1991). Moreover, in two other cases prosodic features of

reading were emphasized as an important dimension of oral reading fluency (Schreiber, 1991; Zutell & Rasinski, 1991). In the latter part of the 1981-1999 period, comprehension was introduced as a characteristic of reading fluency. The introduction of comprehension marked a change from earlier definitions that focused only on word recognition (Harris & Hodges, 1995; Meyer & Felton, 1999). Overall, the five definitions, or descriptions featured in Table 1 show that, for the better part of two decades in the 1980s and 1990s, the terms, reading fluency and oral reading fluency were used interchangeably. Moreover, a systematic analysis of their usage shows limited development or evolution of thought in the conceptualization of reading fluency.

Table 2 shows a dramatic increase in the number of definitions that appeared between 2000-2006. In 2000 the Report of the National Reading Panel (NRP) marked a transition which effectively raised the profile and sparked increased interest in the construct of reading fluency. The NRP was convened with a Congressional mandate in the United States to examine the status of research-based knowledge and the efficacy of a range of approaches for teaching children to read. The NRP report (NICHD, 2000) represented the culmination of an intensive three-year study which examined and summarized the relevant empirical research of a specified set of topics in order to identify the effectiveness of certain instructional practices and approaches to the improvement of reading achievement. Reading fluency was one of the examined and summarized topics. The NRP report has had a profound impact on the current focus and direction of research and instructional practices related to reading fluency. As a result, several additional factors or characteristics of reading fluency emerged in the literature.

Between 2000-2006 inclusive, twenty additional definitions, or descriptions of reading fluency and of oral reading fluency were found in the literature. These twenty definitions include one to five characteristic features of reading fluency showing some overlap and pattern of consistency of three or four characteristics across and within several of the definitions. Similar to two earlier definitions presented in Table 1, one of the definitions in 2006 focuses solely on prosody as the primary characteristic feature of reading fluency. Allington (2006) presented the following perspective, "…fluency is reading in phrases, with appropriate intonation and prosody – fluency is reading with expression" (p. 94). This definition focuses on the superficial aspects of fluency and how reading "sounds." Although prosody is mentioned in a number of definitions during this period, it is generally treated in conjunction with other characteristic features.

Analysis of Table 2 shows five distinct patterns emerging across the range of twenty definitions. One pattern includes thirteen definitions that focus on rate, accuracy and prosody collectively as the three fundamental dimensions of reading fluency. Three of the thirteen definitions feature rate, accuracy, and prosody exclusively as the defining characteristics of oral reading fluency (NICHD, 2000; Hudson, Lane & Pullen, 2005; Torgesen & Hudson, 2006). The National Reading Panel, for instance, characterized fluency as the "ability to read text quickly, accurately, and with proper expression" (Chapter 3, p. 5). However, some researchers view these three dimensions as merely the "surface level and easily observable" aspects of reading (Rasinski, 2006), or as the "indicators of fluency" (Samuels, 2006) which enable readers to access and process the text. Although accuracy, rate, and prosody have been typically associated with an oral reading context, several definitions of fluency have acknowledged the importance of

these fundamental skills to silent reading comprehension as well (Hiebert, 2006; Pikulski, 2006; Pikulski & Chard, 2005; Topping, 2006).

Consistent with Harris and Hodges' (1995) definition of fluency, comprehension is the second pattern to draw attention in the conceptualization of reading fluency during this period. Consequently, ten of the twenty definitions in Table 2 contain either explicit or implicit reference to four primary characteristic features of reading fluency including rate, accuracy, prosody, and comprehension. Although two of these definitions explicitly mention all four aspects of fluency equally (Hudson, Mercer, & Lane, 2000; Johns, 2002), the remaining eight merely imply that accuracy, rate and prosody are necessary and fundamental to the process of reading comprehension (Pikulski, 2006; Pikulski & Chard, 2005; Pressley, Gaskins, Fingeret, 2006; Rasinski, 2004; Rasinski, 2006; Samuels, 2006; Topping, 2006; Wolf & Katzir-Cohen, 2001). For example, Rasinski (2004) states, "Reading fluency has three important dimensions that build a bridge to comprehension…accuracy in word decoding…automatic processing…(and) prosodic reading" (p. 46). Rasinski maintains that these "surface-level" characteristics of reading fluency serve as the means to an end, that is the comprehension of text. In addition, Pikulski and Chard's (2005) description of fluency emphasizes that the observable reading behaviours associated with oral reading are also relevant and necessary for comprehension, "Fluency is manifested in accurate, rapid, expressive oral reading and is applied during, and makes possible, silent reading comprehension" (p. 510). The rationale of this perspective is that once readers can negotiate the "surface-level" aspects of reading and are capable of processing text at the word level, they are positioned to

focus attention on constructing meaning and comprehending the text (Pressley, Gaskins, & Fingeret, 2006).

The third pattern to emerge from the definitions is the link between decoding and comprehension. Table 2 shows that seven of the twenty current definitions of reading fluency place particular emphasis on the integral relationship between decoding and comprehension (Deno & Marston, 2006; Hiebert, 2006; Palumbo & Willcutt, 2006; Pikulski, 2006; Pikulski & Chard, 2005; Rasinski, 2004; Samuels, 2006). Grounded in automaticity theory, Samuels (2006) stresses the importance of the simultaneous coordination of decoding and comprehension, "…reading fluency is defined as the ability to decode and comprehend at the same time. However, fluency is situational…The ability to decode and comprehend at the same time is profoundly important to understanding how to determine if a student is fluent…the critical test of fluency is the ability to decode a text and to understand it simultaneously" (pp. 39-40). He explains that the ability to read words accurately and efficiently, to group words into meaningful phrases, and to read with expression all comprise the observable indicators of oral reading fluency. However, he maintains that the distinguishing feature of fluency is whether the text can be read and understood at the same time. Similar to Rasinski's (2004) perspective, Samuels suggests that the observable indicators of oral reading may in fact serve as the conduit between decoding and comprehension.

In another discussion of fluency, Pressley, Gaskins, and Fingeret (2006) endorse the integral connection between decoding and comprehension, "[f]luency at the word level, as operationalized as reading accurately and quickly, is necessary so that the reader can choose to slow down and employ the comprehension strategies…" (p. 47). These

authors imply that fluency at the word-level makes it possible for readers to process text and to consciously activate strategies to support the construction of meaning and interpretation of text. Additionally, Pikulski (2006) explains that the reciprocal relationship between decoding and comprehension is central to the conceptualization of reading fluency, "Reading fluency is a developmental process that refers to efficient, effective decoding skills that permit a reader to comprehend text. There is a reciprocal relationship between decoding and comprehension. Fluency is manifested in accurate, rapid, expressive oral reading and is applied during, and makes possible, silent-reading comprehension" (p. 72). Although many of the definitions in Table 2 grant that fluency entails reading text accurately, efficiently and expressively, there seems to be an emerging view that the ultimate value and purpose of fluency lies in what it enables (Topping, 2006). Current literature suggests that reading fluency serves to enable comprehension (Paris, 2005).

The systematic analysis of the definitions between 2000-2006 uncovered a fourth and rather divergent pattern in 2001. Table 2 shows a cluster of four definitions, or descriptions of fluency found in the literature that originated from the field of psychology which characterized fluency in a more wholistic and comprehensive manner than those in the reading field. This cluster of expansive definitions implies that fluency depends on proficiency in the underlying processes (e.g., perceptual, phonological, orthographic, and morphological) and the component subskills of reading including phonological awareness, alphabet knowledge, and letter-sound correspondence. These processes and subskills are necessary and essential for the development of word-level and text-level fluency which ultimately serves to enable comprehension (Berninger et al., 2001; Fuchs

et al., 2001; Kame'enui et al., 2001; Wolf & Katzir-Cohen, 2001). From this psychological perspective, fluency, it appears, operates at multiple levels beyond merely word- and text-level proficiency. For instance, Wolf's and Katzir-Cohen's (2001) multi-faceted description of fluency accounts for the range of processes involved in reading,

> In its beginnings, reading fluency is the product of the initial development of accuracy and the subsequent development of automaticity in underlying sublexical processes, lexical processes, and their integration in single-word reading and connected text. These include perceptual, phonological, orthographic, and morphological processes at the letter, letter-pattern, and word levels, as well as semantic and syntactic processes at the word level and connected-text level. After it is fully developed, reading fluency refers to a level of accuracy and rate where decoding is relatively effortless; where oral reading is smooth and accurate with correct prosody; and where attention can be allocated to comprehension (p. 219).

Such a detailed view suggests that reading fluency involves the consolidation and application of each and every underlying component, process and subskill involved in proficient reading. Wolf and Katzir-Cohen's view of reading might represent a "part-to-whole" perspective of reading development which suggests that there is a hierarchy of basic skills that need to be acquired separately and to a certain level of proficiency in order to be able to read fluently with comprehension. The description seems all-encompassing, but unfortunately, it presupposes a clear understanding of the underlying processes which themselves are complex. The technical and psychological language used

in Wolf and Katzir-Cohen's definition would need to be dissected in order to be of use in practice, if at all. In addition, Fuchs and her colleagues (2001) stated,

> Our proposition is that oral reading fluency represents a complicated, multifaceted performance that entails, for example, a reader's perceptual skill at automatically translating letters into coherent sound representations, unitizing those sound components into recognizable wholes and automatically accessing lexical representations, processing meaningful connections within and between sentences, relating text meaning to prior information, and making inferences to support missing information (pp. 239-240).

Again, the definition proposed by Fuchs and her colleagues suggests a broad and complex view which does not aid in the construction of a clear understanding of the dimensions that comprise reading fluency for the purposes of measurement or instruction. The four definitions from the psychological perspective suggest that reading fluency is equated with the mastery of a range of complex processes and skills that span across the developmental continuum from the earliest stages of learning the most basic reading skills. These four descriptions represent a departure from text-level reading fluency to a much broader scope that incorporates all aspects of effective reading skill. Unfortunately, these four descriptions do not contribute increased clarity to our understanding of the term, reading fluency. Nonetheless, they do raise the question of whether previous conceptualizations were too narrow and thus, sufficiently inclusive.

The fifth and final pattern identified among the twenty definitions serves only to detract from the attainment of clarity in the conceptualization of reading fluency because they include the term, automaticity. Thirteen of the twenty definitions, or descriptions of

reading fluency between 2000 and 2006, include either explicit or implicit reference to automaticity (Berninger et al., 2001; Fuchs et al., 2001; Hiebert, 2006; Hudson, Lane & Pullen, 2005; Kame'enui et al., 2001; Pikulski, 2006; Pikulski & Chard, 2005; Pressley, Gaskins, Fingeret, 2006; Rasinski, 2004; Samuels, 2006; Topping, 2006; Torgesen & Hudson, 2006; Wolf & Katzir-Cohen, 2001). Some of these descriptions of fluency emphasize automaticity as it relates to developing efficient decoding skills. For example, Rasinski (2004) explains that an important dimension of reading fluency includes the "automatic processing" of words. At the same time, Hiebert (2006) indicates that word recognition must be "sufficiently automatic and accurate" in order for a reader to focus attention on constructing meaning from text. Alternatively, other authors refer to automaticity as it pertains to various internal reading processes. Berninger and her colleagues (2001) refer to the efficiency and automaticity of internal processes (e.g., phonological, orthographic and morphological systems) which influence the development of fluency. Concurrently, Wolf and Katzir-Cohen (2001) explain that reading fluency depends on the "development of automaticity in underlying sublexical processes, lexical processes, and their integration in single-word reading and connected text" (p. 219). In addition, Fuchs and her colleagues (2001) suggest that oral reading fluency relies on a reader's perceptual ability of, "automatically translating letters into coherent sound representations, unitizing those sound components into recognizable wholes and automatically accessing lexical representations, processing meaningful connections within and between sentences, relating text meaning to prior information, and making inferences to support missing information" (p. 239).

Automaticity is a complex concept that is separate and distinct from the definition of reading fluency, albeit a likely aspect of reading fluency. The introduction of this highly complex concept adds another layer of intricacy to the definition of reading fluency, and invites further questions as to whether the concepts of reading fluency are complementary, interdependent, or reciprocal. For example, automaticity, like reading fluency is not an all or none skill (Kame'enui & Simmons, 2001). Reading is a complex process and its full development requires the acquisition of many sub-skills. It is known that the learning of any skill involves at least three phases of development, namely cognitive, mastering, and automaticity (Downing, 1979; Fitts & Posner, 1967; Sadoski & Paivio, 2004). The cognitive phase involves understanding the task, then is followed by the learning of specific skills to the point of mastery, and then automaticity where the reader practices beyond mastery to the point of being able to perform the skill without conscious attention (Samuels, 1994; Logan, 1997; Schwanenflugel et al., 2006; Thurlow & van den Broek, 1997). In other words, automaticity involves three important aspects that are also commonly tied to reading fluency, reading words accurately, efficiently, and effortlessly. If we look at a child who reads word-by-word, we might say that the child lacks automaticity in reading, as well as reading fluency. However, there is more to fluency than the ability to read words accurately and efficiently. The difference between automaticity and fluency may lie in the fact that fluency also entails reading text prosodically and with expression. The converging picture of reading fluency is that it is a complex aspect of reading well that involves many subskills that are themselves complex.

In summary, Table 2 highlights a number of overlapping characteristics of reading fluency which reflect some evolution in our understanding of the construct. It seems

increasingly evident that word accuracy, rate, and prosody are considered necessary dimensions of reading fluency and that fluency is integrally linked to comprehension. However, there remains a great deal of ambiguity surrounding reading fluency in the research literature and a lack of consensus on whether accuracy, rate, and prosody are sufficient dimensions. One of the leading publications from the International Reading Association (IRA) titled, *What Research Has to Say About Fluency Instruction* (Samuels & Farstrup, 2006) contains ten chapters about various aspects of reading fluency. Each of the chapters, written by some of the leading researchers in the field, provides an explanation of the author's definition or perspective on reading fluency. All of these definitions, or descriptions have been featured in Table 2. One of the striking features about this book is the persistent lack of consistency and clarity on the dimensions that make up reading fluency. In their introduction, the editors, Samuels and Farstrup (2006), capture the reality of the quagmire that surrounds reading fluency when they suggest that it is left to the readers' discretion to determine for themselves which definition of reading fluency they agree with and support,

> With the newborn importance of reading fluency has come two important problems: how one defines fluency and how one assesses it. The two problems are intertwined because how one defines fluency influences how it will be measured. Measurement is an important issue because of the controversy and concern about the validity of some of the methods that are widely used to measure fluency. As you read the chapters in this book that address some of these problems, you will have to decide for yourself which definitions and which approaches to assessing fluency make sense and which ones do not (p. 2).

Although Table 2 clearly shows some commonalities and patterns of convergence in the conceptualization of reading fluency, there is no consensus on what precisely distinguishes reading fluency from other constructs of reading. In fact, the perception that I am forming is that perhaps a misguided approach has been taken thus far in the reading field. That is, the attempt to focus on a single subskill separate and distinct from the complex process of reading may not be a workable way to proceed.

In the next chapter, I review how reading fluency is used and studied as a construct in the experimental literature.

CHAPTER 4: READING FLUENCY INTERVENTIONS

To establish a broader understanding of how reading fluency is currently conceptualized in the field, I examined the experimental literature in addition to the definitional literature. This chapter presents an analysis of intervention research focusing on how reading fluency is defined and measured in the research literature. This review specifies the dimensions of reading fluency examined, how these dimensions are evaluated to monitor growth, as well as provides a summary of the pertinent findings about reading fluency development. The primary purpose of this review is to investigate how the construct of reading fluency is defined in the intervention research. In this review I examine studies between 1970 and 2007 which focused on interventions designed to improve reading fluency. These studies were analysed to determine how reading fluency was studied and what contribution they make to the overall conceptualization of reading fluency.

The initial database search uncovered five relevant articles which include one summary, three syntheses and one meta-analysis of data from a number of reading fluency intervention studies, with particular emphasis on repeated reading interventions (Chard, Vaughn, & Tyler, 2002; Kuhn & Stahl, 2003; Meyer & Felton, 1999; NICHD, 2000; Therrien, 2004). These articles are summarized and compared in chronological order.

Report of Reading Fluency Intervention: Meyer and Felton (1999)

In an examination of reading fluency intervention studies, Meyer and Felton (1999) posed the following broad, pragmatic question: "How are educators and clinicians to promote reading fluency?" In their article, they trace the historical and theoretical

bases of reading fluency training and the efficacy of repeated reading training procedures, the most common type of intervention found in the research literature. Meyer and Felton suggest three theoretical explanations for dysfluent reading, that is, slow rate of word identification (LaBerge & Samuels, 1974; Samuels, 1979), difficulty recognizing or retrieving words automatically, which in turn according to Adams (1990) may exhibit weaknesses in phonological awareness and phonological processing skills. In addition, slow recognition of individual words is related to the rate of lexical access or naming speed. Individuals who demonstrate weaknesses in naming speed have difficulty retrieving and recognizing common sight words, word patterns, and letter-sound association. The second theoretical explanation is difficulty assimilating the rhythmic and prosodic cues of written language. Dysfluent readers have difficulty negotiating the syntactical structure of written text (Schreiber, 1991). In addition, their reading lacks appropriate phrasing, stress, intonation, and duration which ultimately affects their reading fluency and ability to bring meaning to the text. Meyer and Felton's third theoretical explanation emphasizes the fundamental importance of orthographic and semantic connections. Two factors that contribute to reading fluency are the simultaneous and coordinated processing of orthography and meaning (Adams, 1990). In other words, the process involves recognizing letter patterns and words and simultaneously understanding the meaning of those words. Dysfluent readers often demonstrate difficulty coordinating the simultaneous recognition and understanding of the graphic and semantic processes.

Meyer and Felton (1999) report outcome data from fifteen Repeated Reading-Fluency Training research studies between 1981 and 1999 to address thirteen questions.

The authors conclude that there is evidence to support the efficacy of fluency training with repeated reading techniques and they suggest ten principles of fluency training for students with reading disabilities. The authors also feature three fluency training approaches that utilize repeated reading techniques: *RAVE-O*, *Great Leaps Program*, and *Decoding Pilot Program*. A summary of the thirteen questions and their respective conclusions suggested by Meyer and Felton (1999) follows.

1. How fluent is fluent?

To address this question, Meyer and Felton (1999) highlight three of the most common measures of reading fluency: (a) oral reading rate per minute reported as words per minute (wpm), (b) the number and length of pauses during oral reading, and (c) rating the prosodic quality of oral reading including phrasing, fluency and expression. Based on data from two research studies (Dowhower, 1987; Herman, 1985) as well as information derived from the *Great Leaps Program* (Mercer & Campbell, 1998), Meyer and Felton suggest the following average range of reading rate (words read per minute) for specific grade levels: Grade 1 (30-50 wpm); Mid-Grade 2 (85-120 wpm); Grade 5 and above (120-150 wpm). Based on information from the *Nelson-Denny Reading Test* (1993), the mean silent reading rate reported for high school students is 200 wpm (+/-20). The research seems to suggest that the speed of oral and silent reading tends to increase consistently and incrementally over time. The second most common fluency assessment practice of counting the number and length of pauses has produced conflicting results. In a study of nonfluent grade four, five and six readers, Herman (1985) found that as the readers gained proficiency, their length of pauses did not decrease. However, Dowhower (1987) found that when second grade transitional readers had reached a certain level of

reading proficiency (unspecified), the number of pauses in their oral reading diminished. Meyer and Felton (1999) suggest that the main controversy here centers on whether the ultimate goal of fluent reading is to be able to read without pausing. The third most common measure of reading fluency involves rating the quality of oral reading (Young, Bowers, MacKinnon, 1996) using a fluency scale (Allington & Brown, 1979). The authors indicate that this approach is somewhat more complex than the other two measures because it requires two separate evaluators. Based on Meyer and Felton's (1999) summary, there appears to be no clear answer to the question; *how fluent is fluent*?

2. Can reading speed be increased by Repeated Reading?

Meyer and Felton (1999) report findings which suggest that reading speed (measured as words read per minute) can be increased by Repeated Reading for certain groups of students including: normal (undefined in studies) third grade readers (Faulkner & Levy, 1994; O'Shea, Sindelar, & O'Shea, 1985; Rasinski, 1990), second grade readers with normal (undefined in studies) decoding skills but slow reading rate (Dowhower, 1987), and older elementary school students who are poor readers (Faulkner & Levy, 1994; Flynn, Rahbar, & Deering, 1998; Herman, 1985; Rashotte & Torgesen, 1985; Stoddard et al.,1993). Based on the studies in this review which examine only students from grades two to seven, the authors conclude that these findings do not generalize to students beyond these groups as specified.

3. Do reader characteristics influence the amount of improvement?

In response to this question, Meyer and Felton (1999) focus on two particular reader characteristics related to reading rate: naming speed and reliance on decoding for word recognition. They discuss the results from three studies which looked at naming

speed or reliance on decoding as factors related to the improvement in reading fluency as measured by rate of reading (wpm) after repeated reading training. In one study of average and poor readers (Bowers, 1993) comparing the factors related to reading rate, the students with faster naming speed showed greater improvement in reading rate after training. In the same study, readers with deficits in naming speed showed less improvement in reading rate than those individuals with average naming speed. However, another study of poor grade four readers (Levy, Abello, & Lysynchuk, 1997) found that those students with slower naming speed showed greater gains in reading rate after training than their peers who demonstrated faster naming speed. Both studies found that faster naming speed predicted reading rate prior to and after the training period. In addition, a third study (Flynn, Rahbar, & Deering, 1998) showed that students who were overly reliant on decoding, referred to as "dysorthographic" readers, showed greater increases in reading rate after seven months of repeated reading training than did those students who were considered "dysphonetic" readers who were described as rapid but inaccurate decoders. Based on the information from the first two studies (Bowers, 1993; Levy, Abello, and Lysynchuk, 1997), it is not clear whether faster or slower naming speed influences the amount of improvement in reading rate, whereas the third study (Flynn, Rahbar, & Deering, 1998) suggests that readers who are overly reliant on decoding for word recognition seem to make the most gains in reading rate.

4. Given that accuracy is another measure of fluency, can reading accuracy be increased by Repeated Reading?

Meyer and Felton (1999) cite six studies (Dowhower, 1987; Flynn, Rahbar, & Deering, 1998; Herman, 1985; Rasinski, 1990; van Bon et al., 1991; Young, Bowers, &

MacKinnon, 1996) that examined the effects of some variation of Repeated Reading training on word accuracy by measuring and comparing the number of words read correctly on word lists and/or pre- and post-test passages. All six reported that word reading accuracy showed significant improvement for the particular groups of students in these studies. Meyer and Felton (1999) conclude that word recognition accuracy can be increased by Repeated Reading techniques for several different groups of students including: poor grade four to six readers, disabled grade two to six readers, grade two transitional readers, and average grade three readers.

5. How many rereadings are needed to improve reading rate?

In a study of average third grade readers who were required to reread passages seven times, O'Shea and his colleagues (1985) found that 83% of the improvement in reading rate occurred after four readings of the text. Two other studies of average and disabled readers (Bowers, 1993; Young, Bowers, & MacKinnon, 1996) used repeated reading techniques with the same passages three or four times on average. That being said, there were no precise conclusions by Meyer and Felton to indicate the optimal number of rereadings to ensure improved reading rate.

6. What is the average duration of fluency training during a single session?

Meyer and Felton (1999) report that many studies seem to show that the fluency training sessions which include the implementation of intervention, progress measures of rate, fluency, accuracy, and comprehension, as well as error correction, average about 15 minutes daily. However, they do not provide citations for this assertion.

7. What level of instructor training is needed to implement Repeated Reading?

The studies of repeated reading training do not specifically address the level of instructor training needed to implement Repeated Reading techniques. However, Meyer and Felton (1999) indicate that there is some evidence to suggest that with proper guidance and instruction repeated reading techniques can be implemented by teachers, paraprofessionals, and volunteers (Mercer & Campbell, 1998), as well as proficient peers (Simmons et al., 1990), and parents.

8. Which types of repeated readings are most effective: assisted, unassisted, or prosody?

Meyer and Felton (1999) indicate that the results of research on repeated reading techniques vary depending on the reading level and skill of students prior to the repeated reading intervention. Two studies (Dowhower, 1987; Rasinski, 1990) showed that average readers who participated in assisted, unassisted and prosodic repeated reading techniques made improvement in reading rate and word accuracy. In addition, Dowhower (1987) suggested that practicing reading simultaneously with a fluent reader may be particularly effective for beginning readers who have proficient decoding skills but slow reading rate. A third study (Young, Bowers, & MacKinnon, 1996) found that the reading performance of fifth grade students with reading disabilities improved whether they participated in assisted repeated reading (prosodic modeling or reading simultaneously with a fluent reader) or unassisted repeated reading of text (reading the text independently). The study also showed that the rereading of text accounted for the most improvement. It is unclear whether this finding suggests that assisted and unassisted repeated reading techniques might be considered more effective than prosody. Meyer and Felton (1999) did not provide a definitive answer to the question of which types of repeated reading are most effective. The most that we can say from their description is

that, in general, different types of repeated reading have shown positive effects for certain groups of students.

9. What is the role of text difficulty in reading fluency?

Meyer and Felton (1999) cited the results of a study (Young & Bowers, 1995) which examined the effects of text difficulty on oral reading fluency of average and poor grade five readers. The results showed that as the text became progressively more difficult for the poor readers, their reading rate, accuracy and fluency (phrasing and expression) were negatively affected. This study reported that naming speed accounted for much of the variance in reading rate and fluency. In addition, they suggest that for those individuals with weak naming speed, accuracy of reading may not be equivalent to oral reading rate and fluency. Meyer and Felton (1999) conclude that text difficulty has a diminishing effect on fluency for poor readers and therefore, it might be advisable for reading fluency training to incorporate easier texts with a high degree of word accuracy for individuals with slow naming speed.

10. What factors in Repeated Reading increase the likelihood that the effects will transfer to novel text?

Data from two research studies (Dowhower, 1987; Rashotte & Torgesen, 1985) suggest that the number of shared words is one of the key factors in Repeated Reading which increases the likelihood of transfer of reading fluency between texts, that is from the learned texts to new texts. A third study (Faulkner & Levy, 1994) of sixth grade average and poor readers suggested that shared words on more difficult stories resulted in improved fluency transfer to new texts; however, it was the shared content that made a difference in fluency transfer on the easier texts. Young, Bowers, & MacKinnon (1996)

compared transfer effects of fluency for grade five poor readers who participated in four training conditions including repeated practice of word lists from text; listening to text read aloud repeatedly; unassisted reading with error correction; and assisted repeated reading with students reading simultaneously with the teacher. They found that transfer effects of oral reading expression and comprehension to novel texts were reported in all training conditions. Transfer of reading rate was reported for three repeated reading conditions only, with the exception being the repeated listening condition. However, increased word accuracy on unfamiliar text was reported only for the assisted repeated reading condition. These results suggest that shared words and assisted repeated reading are the most likely factors to influence the transfer of word accuracy, reading rate, oral expression, and comprehension to novel texts.

11. Does Repeated Reading improve comprehension?

Meyer and Felton (1999) indicate that there is no straightforward response to the question whether Repeated Reading improves comprehension because of the variability across studies including: the numerous ways that comprehension is measured, the variations in sample size, and the discrepancies in the research findings. To illustrate this point, they describe three studies that show different findings related to comprehension. When comparing groups of students who participated in assisted repeated reading with prosodic modeling versus unassisted independent repeated reading of text, Dowhower (1987) found that grade two transitional readers made more significant gains in comprehension in the former condition, whereas, Young, Bowers, and MacKinnon (1996) found that fifth grade disabled readers who were in the unassisted group showed more improvement in comprehension. In another study (O'Shea, Sindelar, & O'Shea,

1985), cueing students prior to repeated reading made a difference to the level of improvement in fluency or comprehension. When the students were cued to pay attention to fluency as they read the text, they showed more improvement in fluency over comprehension. And when the students were cued to pay attention to the meaning of the text, their comprehension and retelling of the story showed greater improvement. Meyer and Felton (1999) do not provide a clear answer to the original question about whether Repeated Reading improves comprehension. They call for more carefully controlled research to shed light on the most effective type of Repeated Reading practice, the optimal length and context of the intervention for particular groups of students which will ultimately produce the most gains in comprehension. They also advise that several factors must be considered when trying to determine whether the fluency training has resulted in gains in comprehension including: the age and reading level of the students, the type of instructional methods, and the cues used to focus student attention while reading.

12. Does rate of reading text improve after practice with single words or phrases?

Meyer and Felton (1999) summarize three techniques for single word training including: flashcard practice, computer practice, and page speed drills. Based on the data from four studies involving average and poor fourth grade readers and disabled readers from grades two to six (Levy, 1999; Levy, Abello, & Lysynchuk, 1997; Tan & Nicholson, 1997; van den Bosch et al., 1995), the authors conclude that practice with single words or phrases improves reading rate of text and should be considered when designing fluency instruction.

13. Does single word or phrase reading practice improve comprehension, and, if so, under what conditions?

The data from three studies (Spring et al., 1981; Tan & Nicholson, 1997; Levy, Abello, & Lysynchuk, 1997) are inconclusive as to whether single word or phrase reading practice improves comprehension. Spring and his colleagues (1981) found that average grade three readers who practiced word lists did not show gains in comprehension on a cloze passage. On the other hand, Tan and Nicholson (1997) found that poor readers in grades two to five made significant gains in comprehension after practicing a list of seven or eight words from a passage. And Levy, Abello, and Lysynchuk (1997) found that when training did not impose time limits on the word list practice, students did not show improvements in comprehension. Conversely, when the training involved speeded drills of word reading, student comprehension improved. In answer to the question, it seems that single word or phrase reading practice improves comprehension with some groups of students under certain conditions; however, it is not exactly clear which groups of students and which conditions are necessary to ensure positive results in comprehension.

Based on their interpretation of the research, Meyer and Felton (1999) outline ten principles of fluency training for students with reading disabilities which promote improvement in reading fluency including reading rate, word accuracy, comprehension, and expressive oral reading. The list of principles emphasizes the following features of fluency training: the use of regularly scheduled fluency training sessions; rereading connected text at the individual's instructional or independent reading level; rereading the same text three or four times on average; and repeatedly practicing single words and phrases. Poor readers, according to Meyer and Felton, may also benefit from increased adult assistance and modeling of expressive reading; reading shorter, decodable texts; and

opportunities to practice words and phrases prior to reading connected text. Another principle suggests that fluency training coupled with other strategies may be important to comprehension. And finally, providing incentives for reading practice and graphing student progress in fluency using measures of reading rate and accuracy may be advisable.

In the last section of their article, Meyer and Felton (1999) describe three new approaches to fluency training which feature Repeated Reading techniques designed for use with particular types of readers: *RAVE-O*, *Great Leaps*, and the *Decoding Pilot Program*. The authors note that while there are a number of fluency training approaches currently under evaluation, they feature only three in their article. Unfortunately, the descriptions of the three approaches do not include any research evidence to support their use.

Reading Fluency Research Synthesis: Report of the National Reading Panel

An important synthesis of reading fluency intervention research was included as part of the Report of the National Reading Panel (NRP). In accordance with the broader NRP mandate to assess the research-based knowledge and the effectiveness of various approaches to teaching children to read, a subgroup comprised of S. Jay Samuels, Timothy Shanahan, and Sally E. Shaywitz was charged with examining the topic of reading fluency. The NRP Fluency Subgroup established a theoretical and empirical research agenda to address the following two purposes: "(1) To review the changing concepts of fluency as an essential aspect of reading, and (2) To consider the effectiveness of two major instructional approaches to fluency development and the readiness of these approaches for wide use by schools" (NICHD, 2000, Chapter 3, p. 5).

To address the theoretical purpose, the NRP report on fluency traced the conceptualization of reading fluency over the last thirty years based on contributions from various disciplines including psychology and linguistics. The most fundamental dimension of reading fluency centers on word recognition (LaBerge & Samuels, 1974; Harris & Hodges, 1995). The two components of word recognition that have received the most attention are accuracy and automaticity. However, it became evident that although word recognition accuracy was essential it was not sufficient to ensure fluency. Over time, the focus shifted toward the speed or automaticity of word recognition as a necessary condition for fluency, and ultimately, for comprehension (LaBerge & Samuels, 1974). It was thought that the ability to read words rapidly was necessary in order to allow a reader to focus attention and cognitive resources on constructing meaning from text. Because of the limitations of memory and cognitive capacity, a reader who struggles to identify words in a text ultimately consumes the cognitive resources that would otherwise be available for comprehension.

The NRP report goes on to make a distinction between automaticity and fluency in reading. They defined fluency as "the ability to read a text quickly, accurately, and with proper expression" (NICHD, 2001, Chapter 3, p. 5). However, they suggest that, "Automaticity involves the processing of complex information that ordinarily requires long periods of training before the behavior can be executed with little effort or attention" (Chapter 3, p. 7). Logan (1997) explained that automaticity in reading involves the instantaneous recognition and processing of words with sufficient speed, effortlessness, autonomy, and little conscious awareness. The NRP report views the development of automaticity and reading fluency as a continuum in which competency gradually

develops through extended practice and repetition (Samuels, 1979). The NRP report points out that although skilled readers may not automatically recognize all words in a text, they readily apply strategies to decode unfamiliar words in the context of what is being read.

The concept of reading fluency expanded in the 1980s to include the ability to group words into meaningful phrases (Schreiber, 1980, 1987). As well as to attend to punctuation and the syntactical structure of written language in order to facilitate the interpretation and comprehension of text. The NRP Fluency Subgroup concluded, based on previous research, "fluency helps enable comprehension by freeing cognitive resources for interpretation" (NICHD, 2001, Chapter 3, p. 6).

Fluent reading, it seems, ultimately involves the ability to perform multiple tasks simultaneously namely; word recognition and comprehension. The NRP report explains that oral reading fluency can be assessed using a number of informal and standardized measures including informal reading inventories, miscue analyses, pausing indices, running records, reading accuracy and rate calculations. The evidence suggests that there is a high correlation between the quantity of reading and reading achievement, though, it is not clear which comes first. Some research on fluency shows that isolated practice of single words has some benefit; however, there is still a question about whether this practice results in sufficient transfer and application to contextual reading. The NRP report clearly outlines how the concept of reading fluency has changed and expanded over time. Reading fluency is no longer viewed as simply a by-product of efficient word recognition; rather, it is a much more complex construct with direct ties to reading comprehension.

To address the second major purpose stated by the Reading Fluency Subgroup, the NRP report on fluency included two comprehensive research syntheses of experimental studies which examined the efficacy of repeated reading and other guided oral reading practices, as well as practices designed to increase the amount of independent reading. Similar to Meyer and Felton's (1999) purpose, the NRP's syntheses were intended to examine a body of research literature to determine which types of reading practice would be most effective for improving reading fluency and overall reading achievement. Each research synthesis involved a comprehensive database search of PsycINFO and ERIC to identify and code research in compliance with the following selection criteria: experimental studies which examined the effects of repeated reading, guided oral reading, and increased independent reading practices on overall reading achievement; studies of English language reading; studies with participants from kindergarten to grade 12; and studies published in refereed journals. Additional studies were identified by examining pertinent article reference lists. After careful analysis and interpretation of the relevant research, the NRP subgroup reported their findings and conclusions for each synthesis. The major points from the two syntheses are presented next.

Repeated Oral Reading and Guided Repeated Oral Reading Practice

The results from the NRP synthesis overlap with those reported in the Meyer and Felton (1999) report which examined fifteen studies of repeated reading fluency training. The NRP's synthesis included data from over fifty studies of repeated reading and guided repeated oral reading with eight overlapping studies from Meyer and Felton's 1999 report (Dowhower, 1987; Herman, 1985; O'Shea, Sindelar, & O'Shea, 1985; Rashotte &

Torgesen, 1985; Rasinski, 1990; Stoddard et al., 1993; van Bon et al., 1991; Young, Bowers, & MacKinnon, 1996). Consistent with Meyer and Felton's (1999) work, the studies examined for the NRP synthesis consisted of a wide range of methodologies and variations of repeated reading and guided repeated oral reading techniques. Moreover, the array of procedures had several common features including: students were engaged in repeatedly reading text for a set number of times or until a certain fluency criterion was achieved; the quantity of oral reading practice was increased and supported through one-to-one instruction and tutoring or the use of audiotape and computer programs; and readers were provided feedback on their performance. The techniques studied by the NRP Reading Fluency Subgroup included repeated reading (Samuels, 1979), neurological impress (Heckelman, 1969), radio reading (Greene, 1979), paired reading (Topping, 1987), and other variations of guided oral reading practice. The NRP report on fluency organized the studies into the following four sets:

- studies that tested immediate impact of procedures on reading performance (no transfer);
- studies that involved group experiments;
- studies that used single subject designs; and
- studies that compared methods of guided oral reading.

The eight overlapping studies from Meyer and Felton (1999) were distributed across the four categories of the NRP synthesis (including three immediate effect studies; one group experiment; one single-subject design; and three methods comparisons). In the next section, I present the salient findings from each of the four categories and compare

these findings with those from Meyer and Felton's (1999) examination of repeated reading fluency training studies.

Immediate effect studies. Fourteen studies between 1979 and 1999 tested the immediate effects of repeated reading and guided repeated oral reading on reading performance (Faulkner & Levy, 1999; Levy, Nicholls, & Kohen, 1993; Neill, 1979; O'Shea, Sindelar, & O'Shea, 1985; Pany & McCoy, 1988; Rasinski, 1990; Reitsma, 1988; Rose & Beattie, 1986; Sindelar, Monda, & O'Shea, 1990; Smith, 1979; Stoddard et al., 1993; Taylor, Wade, & Yekovich, 1985; Turpie & Paratore, 1995; VanWagenen, Williams, & McLaughlin, 1994). The studies examined a total of 752 subjects including average readers, poor readers, and students identified with learning disabilities from grades one to college. In these studies, students were involved in multiple readings of texts and their performance was measured to compare the differences from first reading to final reading. The results showed improvements in reading rate, accuracy, and comprehension after multiple readings of the text regardless of the measure used, the reading level, or the age of the students. It is important to note that these studies did not measure transfer effects to other passages.

Based on outcome data from several studies, some of which overlapped with those included in the NRP synthesis, Meyer and Felton (1999) also concluded that reading rate and word accuracy increased as a result of repeated reading techniques for a range of elementary students from grades two to seven (Dowhower, 1987; Faulkner & Levy, 1994; Flynn, Rahbar, & Deering, 1998; Herman, 1985; O'Shea, Sindelar, & O'Shea, 1985; Rashotte & Torgesen, 1985; Rasinski, 1990; Stoddard et al., 1993; van Bon et al., 1991; Young, Bowers, & MacKinnon, 1996). However, Meyer and Felton's

(1999) interpretation of the data was not as definitive as that of the NRP Reading Fluency Subgroup about whether repeated reading procedures improved comprehension. Meyer and Felton (1999) indicated that the variability in methodology, comprehension measures, sample sizes, and the discrepancies in the research findings made it next to impossible to determine whether repeated reading improves comprehension. Meyer and Felton (1999) suggested that more research was necessary to determine conclusively whether repeated reading fluency training results in gains in comprehension.

Group experiments. Data from sixteen group experiments between 1970 and 1996 were used to evaluate the impact of repeated reading and guided oral reading on student reading achievement (Conte & Humphreys, 1989; Eldredge, 1990; Eldredge, Reutzel, & Hollingsworth, 1996; Hollingsworth, 1970, 1978; Labbo & Teale, 1990; Lorenz & Vockell, 1979; Mathes & Fuchs, 1993; Miller, Robson, & Bushell, 1986; Rasinski et al, 1994; Reutzel & Hollingsworth, 1993; Shany & Biemiller, 1995; Simmons et al., 1994; Simmons et al., 1995; Thomas & Clapp, 1989; Young, Bowers, & MacKinnnon, 1996). The data from fourteen of these sixteen studies were used as part of the only meta-analysis contained in the NRP report on fluency. Although the two exceptions (Labbo & Teale, 1990; Lorenz & Vockell, 1979) did not provide sufficient data for the meta-analysis, the results and findings from these two studies were considered in the Panel's synthesis.

The meta-analysis of group experimental studies was based on a sample of 605 students including 324 poor readers and 281 good readers from grades two to nine. The studies contained a wide range of instructional approaches including neurological impress, repeated reading, peer tutoring, shared reading, assisted reading, and oral

recitation method. These approaches were carried out by teachers, researchers, parents, peers, and the students themselves with the use of computer programs or tape-recorders. These studies included a treatment and control group design with separate pretest and posttest measures of reading using various tests of word knowledge, comprehension, and fluency, as well as standardized measures. Several studies included more than one experimental group to compare the effects of various guided oral repeated reading treatments with a control group. The results produced multiple effect sizes for various outcome measures. An overall study effect size was derived from the mean effect sizes from each of the fourteen studies. Consequently, this meta-analysis included ninety-nine effect sizes of direct comparisons between the performance of students in guided repeated oral reading experimental groups and control groups. Results from twelve of the fourteen studies showed significant differences in favor of the guided repeated oral reading treatment groups over the control groups with no treatment. Two studies (Lorenz & Vockell, 1979; Mathes & Fuchs, 1993) reported no benefits for students with learning disabilities who participated in several variations of guided repeated oral reading treatments over a no-treatment control condition.

Lorenz and Vockell (1979) reported no improvement in comprehension or vocabulary after a 13-week neurological impress intervention for students with learning disabilities. In addition, Mathes and Fuchs (1993) reported no significant effects when comparing two different interventions, including peer-mediated repeated reading and peer-mediated silent reading, with a control group for students with learning disabilities in a special education setting. Although the overall variance for this meta-analysis was large (0.05 - 1.48), the average and the weighted effect sizes were 0.48 and 0.41,

respectively, which suggested that guided oral reading techniques produced moderate effects on reading achievement for the participants in these particular studies. The outcome measures for the guided repeated oral reading procedures reported the greatest effect on word recognition and fluency (0.50 and 0.44 respectively) with lower effects on comprehension (0.35). These findings corroborate those of Meyer and Felton (1999) that repeated reading fluency training consistently promoted improvement in word recognition and rate, while the impact on comprehension seemed less conclusive.

Single-subject designs. Another source of data used to examine the effect of repeated reading and guided repeated oral reading approaches came from twelve studies conducted between 1974 and 1997 with multiple baseline single-subject designs (Blum et al., 1995; Gilbert, Williams, & McLaughlin, 1996; Herman, 1985; Kamps et al, 1994; Langford, Slade, & Barnett, 1974; Law & Kratochwill, 1993; Mefferd & Pettegrew, 1997; Morgan, 1976; Morgan & Lyon, 1979; Rose, 1984; Tingstrom, Edwards, & Olmi, 1995; Weinstein & Cooke, 1992). These twelve studies included sample sizes ranging from two to thirteen elementary school students with learning difficulties. The procedures involved one-to-one tutoring with a teacher, parent or peer; or repeated reading practice with a tape recorder. The treatments lasted from four weeks to one and a half years in length. These studies included a measure of reading transfer to new material. The students from eleven of the twelve single-subject studies made significant improvement in reading accuracy, rate, as well as comprehension. The NRP acknowledged one exception which was a poorly designed research study (Law & Kratochwill, 1993) because it lacked a sufficient baseline for student reading performance and it did not monitor for treatment fidelity. Nevertheless, Law & Kratochwill (1993) reported no

effects or improvement in word accuracy or reading rate for grades one to three students who participated in a six-week paired reading tutorial intervention with parents. The results from the eleven other single-subject design studies supported the findings from the meta-analysis of the group experiments. Based on these results, the NRP suggested that repeated reading and guided oral reading approaches may produce positive effects on reading achievement. Meyer and Felton (1999) also reported that students from low to average reading proficiency have shown gains in reading fluency as a result of repeated reading practices. In particular, average readers show improvement in accuracy and rate of reading across a range of repeated reading techniques (Dowhower, 1987; Rasinski, 1990). However, Dowhower (1987) suggested that beginning readers may specifically benefit from repeated reading practices that include reading simultaneously with a fluent reader. Moreover, Young, Bowers, and MacKinnnon (1996) found that disabled fifth grade readers' gains in assisted and unassisted repeated reading techniques were mostly accounted for by the actual rereading of the text and not as a result of the particular type of repeated reading technique. Meyer and Felton (1999) suggested that students' reading level prior to the repeated reading practice may be an important factor that influences the results of any given technique. That is, the students who read less well seemed to make greater gains as a result of repeated reading techniques (NICHD, 2000).

Methods comparison. Nine studies between 1981 and 1995 which featured various methods of repeated reading and guided oral reading were examined to determine which methods were most effective and/or feasible for regular classroom application (Carver & Hoffman, 1981; Dixon-Krauss, 1995; Dowhower, 1987; Homan, Klesius & Hite, 1993; Lindsay, Evans, & Jones, 1985; Rashotte & Torgesen, 1985; Van Bon et al.,

1991, Winter, 1986, 1988). Examples of studies that compared the differences between the two methods included: repeated reading with and without feedback (Dowhower, 1987); guided repeated reading and assisted nonrepetitive reading (Homan, Lesius, & Hite, 1993); and tutoring approaches involving peers and parents (Lindsay, Evans, & Jones, 1985; Winter, 1986, 1988). The results of these studies showed that there were little or no differences in efficacy between the compared procedures which suggested that all approaches were equally effective or ineffective. The data from this part of the synthesis provides corroborating evidence for the meta-analysis of the experimental group studies which found that a range of approaches was effective for a variety of students. In addition, Meyer and Felton (1999) reported that no one approach was superior to another and a range of repeated reading approaches seemed effective for different groups of students in a variety of contexts.

Several studies in the NRP synthesis reported that various types of peer tutoring and partner reading were considered effective and manageable procedures for regular and special education classroom applications which required minimal training or special materials (Conte & Humphrey, 1989; Dixon-Krauss, 1995; Labbo & Teale, 1990; Mathes & Fuchs, 1993; Rasinski, 1990; Reutzel & Hollingsworth, 1993; Shany & Biemiller, 1995; Simmons et al., 1994; Simmons et al., 1995). In their report, Meyer and Felton (1999) also suggested that, with minimal training and guidance, repeated reading fluency training approaches could be implemented in a variety of contexts by teachers, paraprofessionals, volunteers (Mercer & Campbell, 1998), parents (Lindsay, Evans, & Jones, 1985), and peers (Simmons et al., 1990).

Based on a synthesis of four sets of studies, the NRP concluded that many repeated reading and guided repeated oral reading approaches are effective for improving reading fluency and overall reading achievement, particularly in the areas of word recognition and rate, with only limited benefits to comprehension. In addition, the NRP suggested that these approaches are valuable for use with a range of elementary students including those with learning difficulties. Furthermore, they concluded that repeated reading and guided repeated oral reading approaches are relevant and practical for elementary classroom application as one part of a comprehensive reading program. The NRP's (2000) results from this particular synthesis were more or less similar and consistent with the results reported by Meyer and Felton (1999) over a decade earlier on repeated reading fluency training research.

Independent Reading Practice - Encouraging Students to Read More

The second research synthesis in the NRP report on fluency included data from fourteen empirical studies between 1975 and 1999 which examined the effects on reading achievement of practices that encourage students to read more (Burley, 1980; Carver & Liebert, 1995; Cline & Kretkey, 1980; Collins, 1980; Davis, 1988; Evans & Towner, 1975; Holt & O'Tuel, 1989; Langford & Allen, 1983; Manning & Manning, 1984; Morrow & Weinstein, 1986; Peak & Dewalt, 1994; Reutzel & Hollingsworth, 1991; Summers & McClelland, 1982; Vollands, Topping, & Evans, 1999). These studies were analysed by the NRP Reading Fluency Subgroup to determine whether practices intended to increase the amount of independent student reading would result in improvement of reading achievement. It is important to note that none of the studies included in this synthesis measured the effects of increased reading on reading fluency even though it

was the Panel's original intention to "determine whether teachers are able to successfully encourage students to read more in ways that would actually improve fluency and overall reading ability" (Chapter 3, p. 21). In addition, the study results were not included in a meta-analysis due to the lack of quantity and quality of the studies in this particular area. The fourteen studies in this synthesis were divided into two groups: *Sustained Silent Reading (SSR)* and *Accelerated Reader (AR)*.

Sustained Silent Reading (SSR). Eleven of the fourteen studies between 1975 and 1999 examined SSR procedures in a variety of contexts with students in grades two to nine (Burley, 1980; Cline & Kretkey, 1980; Collins, 1980; Davis, 1988; Evans & Towner, 1975; Holt & O'Tuel, 1989; Langford & Allen, 1983; Manning & Manning, 1984; Morrow & Weinstein, 1986; Reutzel & Hollingsworth, 1991; Summers & McClelland, 1982). The SSR procedures typically required students to select material and to read silently for 20 minutes per day. Generally, the results from these studies did not provide evidence that SSR either improved reading achievement or resulted in differences in reading attitudes when compared to other methods or to a control group.

Accelerated Reader (AR). Three studies between 1994 and 1999 were examined to determine whether the use of *AR*, a commercial reading program, would produce improved reading achievement (Carver & Liebert, 1995; Peak & Dewalt, 1994; Vollands, Topping, & Evans, 1999). With the exception of one experiment (Vollands, Topping, & Evans, 1999), the results from these three studies do not show any significant or measurable gains in reading improvement from the *AR* program. In fact, one study (Carver & Liebert, 1995) of grades three to five average readers (N = 43) who completed 60 hours of self-selected reading over a 6-week period using the *AR* program showed no

improvement in reading achievement. Based on the results of the fourteen studies involving various types of independent reading, the NRP did not find sufficient evidence that encouraging children to read on their own was an effective practice for increasing reading fluency and overall reading achievement.

In conclusion, the NRP report on fluency provided a carefully constructed synopsis of the body of research on the conceptualization of reading fluency, as well as an examination of the efficacy of two instructional approaches on reading fluency and reading achievement. The NRP concluded that repeated reading and other guided oral reading approaches improve word recognition, fluency (rate and accuracy), and comprehension. They reported evidence which suggested that these approaches can be used in a variety of contexts with a range of students. In contrast, the NRP found that the studies which examined independent reading such as *Sustained Silent Reading* or the *Accelerated Reader* program for mixed-ability groups of elementary to high school students did not produce satisfactory effects to warrant their promotion for improving reading achievement. The NRP called for longitudinal research to examine the effects of procedures designed to increase the amount of student reading for various levels of students and in different contexts.

Implications and Limitations of the NRP Report on Fluency

Since its publication, the Report of the National Reading Panel (NICHD, 2000) has been the object of unrelenting scrutiny and criticism for a number of reasons including the selection of panel membership; the research methodology and process; the topic selection; the criteria selection for literature reviews; and the findings and conclusions in particular areas (Coles, 2001; Cooper, 2001; Cunningham, 2001; Garan,

2001; Krashen, 2001; Yatvin, 2002). I restrict my discussion to the problems regarding the reading fluency section only of the NRP report.

The Panel's decision to examine *Sustained Silent Reading* and *Accelerated Reader* exclusively creates the impression that these two instructional approaches have merit above and beyond approaches that were omitted. Three important limitations from the research synthesis of repeated reading and guided oral repeated reading intervention approaches point to the narrow body of research considered; the narrow student populations and classroom contexts examined; and the restricted types of texts used. These three limitations are potentially misleading. Although there seems to be widespread support for the general findings of the research synthesis on repeated reading and guided repeated oral reading, Rasinski and Hoffman (2003) cautioned, and I agree, that the body of research may have been less than optimal for this type of synthesis, "…the NRP review considered a methodologically narrow range of research and did not fully explicate how the research it reviewed could be implemented into actual classroom practice" (p. 510).

The NRP synthesis included more struggling readers in the context of special education classrooms and from one-to-one tutoring situations than average readers. Timothy Shanahan later reported (2005) that the NRP results showed positive gains in reading fluency for children from grades one to nine. However, he also indicated that the studies conducted in regular classrooms were limited to grades two to four, whereas the remedial reading studies included students from grades one through nine (p. 19). The NRP synthesis included four of fourteen immediate effects studies on normal populations; five of 16 group experimental studies of average classrooms; no single

subject studies of average readers (all twelve single-subject studies involved elementary students with learning problems), and the method used in the comparison studies conducted in regular classrooms was unspecified. Whether the findings of the NRP on repeated reading and guided repeated oral reading are applicable to atypical students with reading difficulties is highly questionable. It seems reasonable to expect a more precise interpretation of the NRP results, in particular which approaches are most suitable for which children and in which learning contexts.

Hiebert and Fisher (2005) reviewed all of the repeated reading and guided repeated oral reading studies originally analysed by the NRP to identify the specific nature of the type of texts used in the various interventions. They found that the NRP derived their effect size for fluency from studies that used texts with controlled vocabulary which contained a number of repeated and frequently occurring words with few rare or unfamiliar words. Hiebert and Fisher (2005) concluded that the NRP results on fluency specifically pertain to texts that contain controlled vocabulary, and thus not to uncontrolled texts. In retrospect, it was incumbent upon the Panel to qualify and to specify that repeated reading and guided repeated oral reading practices are limited in their effectiveness for specific types of students, using particular kinds of texts, at certain grade levels, and in particular contexts.

Furthermore, there is a discrepancy between the Panel's original purpose and their subsequent intentions for the research synthesis on encouraging students to engage in independent reading practice and to read more. The overarching purpose of the NRP report on fluency was "to review the changing concepts of fluency as an essential aspect of reading and to consider the effectiveness of two major instructional approaches to

fluency development and the readiness of these approaches for wide use by the schools" (NICHD, 2000, Chapter 3, p. 5). The Panel defined reading fluency as "the ability to read a text quickly, accurately, and with proper expression (NICHD, 2000, Chapter 3, p. 5). However, their research synthesis on independent reading practices did not analyse the effects of instructional practices on reading fluency, rather, the results focused primarily on reading achievement,

> …the NRP chose to examine what effect encouraging students to read would have on student reading achievement…The Panel's purpose here is to provide a research synthesis of empirical studies that have tested the efficacy of encouraging reading in terms of its impact on improving reading achievement. The Panel hopes to determine whether teachers are able to successfully encourage students to read more in ways that would actually improve fluency and overall reading ability (NICHD, 2000, Chapter 3, p. 21).

Thus, the interpretation of the results from this section of the report does not provide additional information that contributes to the Panel's original goals.

As mentioned previously, the Panel's decision to study *Sustained Silent Reading* (SSR) and *Accelerated Reader* (AR) as the primary instructional approaches for encouraging students to read more is bewildering. The examination of a silent-reading approach does not permit measurement of two presumed to be important dimensions of reading fluency namely, accuracy and expression. The Panel's original research goal to study the effects of instructional approaches on reading fluency development was not possible in the context of silent reading. Moreover, the report clearly stated that the SSR studies did not include a measure of reading fluency which seems incongruous with the

original goal of the NRP report on fluency, "[n]one of these studies attempted to measure the effect of increased reading on fluency. Instead, most of these studies considered the impact of encouraging more reading on overall reading achievement as measured by standardized and informal tests" (NICHD, 2000, Chapter 3, p. 26).

The SSR studies included measures of reading achievement, vocabulary, reading comprehension, word reading, and reading attitudes. It is important to reiterate that the findings did not contribute additional information about the effects of particular instructional approaches on reading fluency. Moreover, SSR practices are not equal. Klump (2007, para. 9) explained that studies of SSR may be mixed because, "…results depend on a variety of factors. Those factors include the purpose of SSR, varying types of SSR, and the length of time that SSR is implemented." There are a number of factors that may impact the overall effectiveness of SSR including the culture of the classroom and how the teacher has established the routines for SSR. In my teaching and consulting experiences, I have questioned the effectiveness of SSR. In different classroom contexts, I have observed little or no teacher monitoring of student reading and/or text selection during SSR time to ensure students are actually actively engaged in reading and have chosen appropriately leveled reading material. In the absence of close teacher monitoring and student engagement, SSR becomes nothing more than a time-filler and a waste of valuable instructional time. If my experience is any indication of typical classroom practice, then it may not be surprising that the SSR studies have not resulted in any noteworthy improvement in reading achievement thus raising questions about the effectiveness of SSR because of poor implementation and monitoring.

Cooper (2005) raised another question about the SSR studies included in the NRP research synthesis, "What, exactly, is being compared in these studies?" (p. 459). The SSR studies reported a wide array of comparison treatments including: reading skills exercises; skills practice; spelling; health and grooming; directed reading activities; regular reading instruction; and "traditional instruction." Cooper (2005) points out that the NRP did not attempt "to ferret out meaningful differences in the comparison groups" (p. 459). As a result, it is difficult to interpret what the results mean in reference to the effectiveness, or ineffectiveness of SSR when the comparison treatments are so poorly defined.

Finally, the most important limitation of the research synthesis on independent reading practices has to do with the Panel's conclusions:

> It would be difficult to interpret this collection of studies as representing clear evidence that encouraging students to read more actually improves reading achievement. Only three studies (Burley, 1980; Davis, 1988; Langford & Allen, 1983) reported any clear reading gains from encouraging students to read, and in the third of these studies the gains were so small as to be of questionable educational value…For the most part, these studies found no gains in reading due to encouraging students to read more. It is unclear whether this was the result of deficiencies in the instructional procedures themselves or to the weaknesses and limitations evident in the study designs…Nevertheless, given the evidence that exists, the Panel cannot conclude that schools should adopt programs to encourage more reading if the intended goal is to improve reading achievement. It

is not that studies have proven that this cannot work, only that it is yet unproven" (NICHD, 2001, Chapter 3, pp. 26-27).

Stahl (2004) stated, "One of the most controversial findings of the NRP report (NICHD, 2000) was the finding that non-monitored reading, in the form of SSR or similar approaches, was not shown to be effective in the experimental studies that the panel reviewed" (p. 205).

It seems the Panel's greatest error of judgment was when they made the sweeping generalization that the evidence from a narrow body of research, including eleven studies of SSR and three studies of Accelerated Reader, did not support the conclusion that "schools should adopt programs to encourage more reading." There has been an overwhelming backlash from the reading field which has resulted in gross misrepresentations and misinterpretations of what the Panel intended. In conclusion, the NRP report on reading fluency and its shortcomings serve to point the way for a more robust synthesis and to highlight the need for ongoing research.

Reading Fluency Research Synthesis: Chard, Vaughn, and Tyler (2002)

Chard, Vaughn and Tyler (2002) conducted a significant research synthesis of reading fluency intervention studies targeted for elementary students with learning disabilities. They contend that although the NRP (NICHD, 2000) found positive effects on reading fluency as a result of repeated reading and guided repeated oral reading for most students, their goal was to determine whether the NRP findings would generalize to students with significant reading problems. Therefore, the purpose of this research synthesis differed from the NRP (NICHD, 2000) with regard to the target group, "Our goal was to locate all intervention studies published and all dissertations conducted

within the past 25 years that evaluated the effects of fluency training on elementary students with LD" (Chard, Vaughn, & Tyler, 2002, p. 402). They defined *learning disability* as "any researcher- or school-identified learning disability" (p. 387) and *fluency* as "the speed and accuracy with which a student reads connected text" (p. 388). Oral reading fluency was measured in terms of rate and accuracy and measures of oral reading included a separate analysis of accuracy, fluency, and prosody. *Reading intervention* was defined as any instructional intervention at the word-level or the connected text level, "designed specifically to increase students' reading fluency in connected text" (p. 388). The researchers searched several databases including ERIC, PsycINFO, and ArticleFirst to locate relevant research met selection criteria guidelines: "(1) the students targeted for the intervention were elementary-age students with LD; (2) the purpose of the study specifically targeted reading fluency, and (3) the study was published in the last quarter of the 20th century" (p. 388). Chard, Vaughn, and Tyler's (2002) research synthesis was comprised of 24 studies between 1975 and 2000 with eight multiple group, five single group, and 11 case studies or single-subject design studies. There were five of eight multiple group studies with a no-treatment comparison condition described as either "traditional instruction" or "commercial or basal reading program." Similar to the first part of the NRP (NICHD, 2000) synthesis on reading fluency and Meyer and Felton's (1999) report, Chard, Vaughn, and Tyler (2002) considered two main types of reading fluency interventions for students with LD: (1) repeated reading interventions, and (2) word practice interventions. The body of research comprised 23 repeated reading intervention studies and two word practice intervention studies (The study by Daly & Martens (1994) was included in both the repeated reading and word interventions). The

major findings are presented next followed by a comparative analysis of the results with the NRP (NICHD, 2000) research synthesis.

Repeated Reading Intervention Research for Students with LD

The twenty-three research studies of repeated reading intervention for students with LD were organized into four categories: (1) repeated reading without a model, (2) repeated reading with a model, (3) repeated reading interventions with multiple features, and (4) other elements that affect fluency performance in repeated reading interventions. The effect of repeated reading on reading fluency of students with LD under a variety of different treatment conditions was examined. The collection of 23 studies represents 14 different research designs which make comparisons virtually impossible. Conclusions were based on the repeated reading results from dependent measures of oral reading fluency and comprehension including: reading speed (including word reading and/or passage reading) reported as words read per minute; reading accuracy (including word reading and/or passage reading) reported as words correct per minute or errors per minute; story retell, passage comprehension reported as questions answered correctly, or a curriculum based maze measure (a timed measure that requires students to replace as many missing words in a passage as they can given several word choices). The results from eight repeated reading intervention studies for LD students were analysed for multiple purposes in more than one category (Cohen, 1988; Daly & Martens, 1994; Monda, 1989; O'Shea, Sindelar, & O'Shea, 1987; Rashotte & Torgesen, 1985; Rose, 1984; Smith, 1979; Weinstein & Cooke, 1992).

It is important to note that 9 of the 23 repeated reading intervention studies for students with LD were also considered in the NRP (NICHD, 2000) research synthesis on

repeated reading and guided repeated oral reading (Gilbert, Williams, & McLaughlin, 1986; Mathes & Fuchs, 1993; Rashotte & Torgesen, 1985; Rose, 1984; Rose & Beattie, 1986; Simmons et al., 1995; Sindelar, Monda, & O'Shea; Smith, 1979; Weinstein & Cooke, 1992). These overlapping studies were distributed across all four categories of the Chard, Vaughn, and Tyler (2002) synthesis with several studies appearing in more than one category (including two repeated reading without a model; five repeated reading with a model; two reading interventions with multiple features; and five studies of other elements that influence fluency performance in repeated reading interventions). Interestingly, the overlapping studies were also distributed across all four categories of the NRP synthesis of repeated reading and guided repeated oral reading (including four immediate effect studies, two group experimental comparison studies, two single-subject studies, and one method comparison study). I turn now to present the main findings from Chard, Vaughn and Tyler's (2002) research synthesis for each of the four categories of repeated reading intervention studies for students with LD.

Repeated reading without a model. Chard, Vaughn, and Tyler (2002) found 9 studies that examined the effect of repeated reading interventions without a model for elementary students with LD between 1984 and 1997 (Cohen, 1988; Daly & Marsten, 1994; Marston et al., 1995; Monda, 1989; O'Shea, Sindelar, & O'Shea, 1987; Rashotte & Torgesen, 1985; Rose, 1984; Stout, 1997; Swain & Allinder, 1996). The studies included sample sizes of three to twenty-nine elementary students with LD. Students ranged in age from 7 years-8 months to 13 years-6 months. Across the nine studies, students were engaged in repeatedly reading connected text under a variety of treatment conditions in terms of the number of repetitions (O'Shea, Sindelar, & O'Shea, 1987; Swain & Allinder,

1996); controlling the amount of text (Cohen, 1988); reading text orally or silently (Monda, 1989; Rose, 1984); reading text with or without overlapping words (Rashotte & Torgesen, 1985); previewing of text prior to repeated reading (Daly & Martens, 1994; Rose, 1984); and reading with a peer (Marston et al., 1995). The interventions ranged in duration from one treatment session (length of session unspecified) to 24 days (length of sessions unspecified).

Chard, Vaughn, and Tyler (2002) reported that 21 (sic) studies (N=128) examined whether repeated reading is "an effective way to improve the reading fluency of students with LD" (p. 389). The study effect sizes of repeated reading without a model on measures of fluency (including rate and accuracy) ranged from 0.02 to 3.02, with an average effect size of 0.68 which suggested modest effects on reading fluency for the students with LD in these particular studies. The outcome measures from the studies of repeated reading without a model showed improvements in accuracy and fluency which corroborates the NRP (NICHD, 2000) findings.

Repeated reading with a model. To determine the effect of repeated reading with a model on reading fluency for students with LD, Chard, Vaughn and Tyler (2002) examined 10 studies between 1979 and 2000 (Daly & Marsten, 1994; Gilbert, Williams, & McLaughlin, 1986; Mathes & Fuchs, 1993; Monda, 1989; Moseley, 1993; Rose, 1984; Rose & Beattie, 1986; Smith, 1979 (Study 1 and 2); Vaughn et al., 2000). The repeated reading intervention studies in this category included three types of modeling: (1) modeling by an adult, (2) modeling by a more proficient peer, and (3) modeling by audiotape or computer. The researchers studied fourteen samples of repeated reading with modeling by an adult (one group [N = 10] and 13 single cases); three samples of repeated

reading with modeling by a more proficient peer (N = 89); and four samples (N = 12) of repeated reading with modeling by audiotape or computer to determine the effects on reading fluency for students with LD. Students ranged from 7- to 13-years of age. Although in some cases the length of sessions were not specified, the duration of interventions lasted from one treatment session to several treatment sessions over a three-month period.

For the most part, the results from four studies of repeated reading with adult modeling (Rose, 1984 Rose & Beattie, 1986; Smith, 1979 (Study 1 and 2)) and four studies of repeated reading of modeling with an audiotape or computer (Daly & Martens, 1994; Gilbert, Williams, & McLaughlin, 1986; Moseley, 1993; Rose & Beattie, 1986) showed positive results on reading fluency. However, Monda (1989) found that repeated reading with an adult model did not produce better results on reading fluency when compared to repeated reading without a model. The two studies of repeated reading with a peer model showed mixed results (Mathes & Fuchs, 1993; Vaughn et al., 2000). Mathes and Fuchs (1993) reported no significant differences in reading fluency between repeated reading with a peer and sustained reading with a partner or a control condition of traditional reading instruction. On the other hand, Vaughn and her colleagues (2000) found moderate effect sizes for reading accuracy and rate for repeated reading with a partner over the Collaborative Strategic Reading treatment (a systematic instructional approach of four active reading and comprehension strategies through direct teaching and cooperative learning groups).

Repeated reading with multiple features. Chard, Vaughn, and Tyler (2002) examined 4 intervention studies between 1991 and 1996 to measure the effects on

reading fluency when repeated reading was included as only one aspect among several instructional features (Fuchs, et al., 1996; Simmons et al., 1995; Sutton, 1991; Weinstein & Cooke, 1992). The research on repeated reading with multiple features included three group samples and four single-case samples (N=52). The students ranged in age from eight- to 10-years of age. Treatment duration was reported for only two studies (Simmons et al., 1995; Fuchs et al., 1996) which lasted between 800 minutes over an 8-week period (session length and frequency unspecified) and 1350 minutes in total (session length and frequency unspecified). The four treatment conditions involved variations of repeated reading with multiple features including: (1) effective teaching combined with peer mediated repeated reading (Simmons et al., 1995); (2) Peer Assisted Learning (PALs) which involved partner repeated reading in combination with comprehension activities including retell, paragraph summarization, and prediction (Fuchs et al., 1996); (3) a blend of teacher modeling and repeated reading to a tutor, partner, and teacher (Sutton, 1991); and (4) students listened to an audiotape model and then participated in two phases of repeated reading including: rereading to a fixed criterion (90 words correct per minute), and rereading (until 3 successive improvements) were achieved (Weinstein & Cooke, 1992).

Across the repeated reading interventions with multiple features, the effect size on measures of fluency ranged from 0.20 to 1.17, with a mean effect size of 0.71.Two studies (Fuchs et al., 1996; Simmons et al., 1995) showed moderate-to-large effect sizes (0.44 and 0.73, respectively) on a measure of oral reading fluency in favour of the interventions with multiple features over the comparison groups who received "traditional reading instruction." Sutton (1991) found a large mean effect size (1.04) for

reading rate and accuracy based on the pretest and posttest results. However, in the absence of a control group, these results cannot be interpreted. In addition, Weinstein and Cooke (1992) found in their research that all four students demonstrated improved reading fluency as a result of a multi-faceted repeated reading intervention. The specific contribution from each aspect of the intervention was not provided, thus making it impossible to pinpoint exactly what contributed to the improved reading fluency.

Other elements of repeated reading interventions. Chard, Vaughn, and Tyler (2002) examined 8 studies between 1976 and 1992 to investigate other elements of repeated reading interventions that influence reading fluency performance including (a) the amount of text, (b) text difficulty, (c) number of repetitions, (d) type of feedback, and (e) criteria for repeated reading (Cohen, 1988; Lovitt & Hansen, 1976; O'Shea, Sindelar, & O'Shea, 1987; Rashotte & Torgesen, 1985; Sindelar, Monda, & O'Shea, 1990; Smith, 1979 (Study 2); Weinstein & Cooke, 1992).

a) Amount of text. Cohen (1988) reported a large mean effect size (1.98) on fluency in favour of two repeated reading intervention treatments that controlled the amount of text presented to students on a computer screen. No significant differences between the repeated reading treatments were reported.

b) Text difficulty. Chard, Vaughn, and Tyler (2002) examined three samples (N = 37) to study the effects of text difficulty in repeated reading interventions. Sindelar, Monda, and O'Shea (1990) found statistically significant differences (1.57) on a measure of oral reading fluency in favour of the treatment sample who repeatedly read a mastery-level text (reading rate of more than 100 words per minute) over the comparison sample who read instructional-level text (reading rate of 50-100 words per minute with two or fewer

errors). However, there was a moderate effect (0.61) for reading accuracy in favour of the sample of students who read the instructional-level text. Meyer and Felton (1999) reported similar results from a study (Young & Bowers, 1995) that examined the effects of text difficulty on oral reading fluency of average and poor grade five readers which showed that the poor readers' performance in reading rate, accuracy and fluency (phrasing and expression) regressed as the text became progressively more difficult. Meyer and Felton (1999) concluded that, in the case of poor readers, text difficulty may result in diminishing effects for reading fluency. They suggested that training which involves practice of easier texts with a high degree of word accuracy for individuals with slow naming speed may be advisable. In contrast, another study that was mentioned in Meyer and Felton's (1999) report and the NRP (NICHD, 2000) report was Rashotte and Torgesen (1985) who found no significant differences between two treatments comparing repeated reading of text that included text with a high degree of overlapping words versus texts with a low degree of word overlap. Interestingly, the sample who repeatedly read text with fewer overlapping words outperformed the comparison sample on all measures.

c) *Number of repetitions*. Two samples (N=54) were considered to investigate the number of repetitions that produced the most optimal results for reading fluency. O'Shea, Sindelar, and O'Shea's (1987) factorial design study found significant differences on a measure of oral reading fluency when a text was reread seven times as compared to three repetitions and a single reading of the text. In addition, two studies (O'Shea, Sindelar, & O'Shea, 1987; Sindelar, Monda, & O'Shea, 1990) found that three repetitions of text produced significantly better results on a measure of oral reading fluency than one reading of the text.

d) Types of feedback. One single-subject sample was studied to analyse the effect of certain types of feedback during repeated reading on reading fluency for elementary students with LD. Smith (1979; Study 2) found that feedback which involved error correction during oral repeated reading resulted in increased accuracy and rate for one single-subject sample.

e) Criteria for repeated reading. Eleven single-subject samples provided insight about the effect of establishing criteria for repeated reading interventions. Weinstein and Cooke (1992) found that students made greater gains in accuracy and reading rate with repeated reading to a fixed-rate criterion (90 words correct per minute) as opposed to an individual improvement criterion. Lovitt & Hansen (1976) also found that a fixed criterion for rate, accuracy and comprehension produced positive results on oral reading fluency.

In conclusion, Chard, Vaughn and Tyler (2002) indicated that the evidence from the intervention research for students with LD favoured repeated reading with a model over repeated reading without a model, especially for students with weak reading fluency (e.g., Rose & Beattie, 1986; Smith, 1979). Although their findings suggest that repeated reading interventions with an audiotape or computer model are more effective than repeated reading without a model, the audiotape and computer models for repeated reading are not as effective as repeated reading with an adult model (Daly & Martens, 1994; Rose & Beattie, 1986). In addition, they report that the jury is still out in terms of peer models, "Repeated reading with a partner as a means to improving fluency has yielded somewhat equivocal results (e.g., Marston, Deno, Dongil, Diment, & Rogers, 1995), although there are few studies documenting its effectiveness alone (Marston et al., 1995; Mathes & Fuchs, 1994)" (p. 402).

Chard, Vaughn and Tyler (2002) asserted that the total amount of text read during repeated reading interventions did not seem to affect the outcome. However, the researchers suggested that students who experience difficulty with reading accuracy may benefit from controlling the amount of text presented because it may allow students more time to focus on the words. They also outlined several essential components of repeated reading interventions for improving oral reading fluency for elementary students with LD including: ensuring opportunities to reread texts multiple times (more repetition is better than fewer); providing adult, audiotape, or computer models of fluent reading; controlling and progressively increasing the difficulty of texts; providing feedback and error correction during oral repeated reading; establishing fixed criteria for performance to help students manage more complex texts; focusing attention on the meaning of texts; and providing daily opportunities to participate in a combination of repeated reading and comprehension activities focused on improving reading fluency and comprehension of text.

Word Practice Intervention Research for Students with LD

The second goal of Chard, Vaughn, and Tyler's (2002) synthesis was to determine the effects of word practice interventions (aside from repeated reading) on reading fluency and other measures of reading. They examined nine single-subject samples (Daly & Martens, 1994; O'Shea, Munson, & O'Shea, 1984) to determine the effectiveness of interventions that involved fluency practice at the word level on overall reading fluency. O'Shea, Munson, and O'Shea (1984) found no significant differences between three interventions: a baseline condition of teacher error correction during oral reading, a flashcard drill of isolated words (using the student's oral reading errors for word

selection), and a flashcard drill of contextual phrases (using the student's oral reading errors as the basis of phrase selection). However, they did find significant differences between interventions in favour of the phrase drill condition on a measure of passage reading accuracy. In another study of word practice, Daly and Martens (1994) found that an intervention sample which involved taped previewing of words read in a list outperformed a baseline and repeated reading condition on measures of word reading accuracy and fluency. However, on measures of passage reading accuracy and fluency, the repeated reading condition was more effective than the taped words condition. The results from this limited analysis suggested that word practice interventions may produce gains in word reading accuracy and fluency, but not in terms of contextual passage reading accuracy and fluency which is ultimately the goal for students with LD who experience difficulties with reading fluency of connected text. The findings from these studies did not provide evidence to support fluency practice at the word level on overall reading fluency. In contrast, Meyer and Felton (1999) promoted the practice of single words and phrases based on the results from four studies of average and poor grade four readers and disabled readers from grades two to six (Levy, 1999; Levy, Abello, & Lysynchuk, 1997; Tan & Nicholson, 1997; van den Bosch et al., 1995) which showed that students made gains in reading rate as a result of isolated word practice.

Comparative Analysis of Two Research Syntheses Results

On the heels of the Report of the NRP (NICHD, 2000), Chard, Vaughn and Tyler (2002) conducted a research synthesis to determine the effects of repeated reading and other types of fluency interventions on the reading fluency of a target population, namely, elementary students with LD. The findings and conclusions of the NRP (NICHD, 2000)

research synthesis and Chard, Vaughn, and Tyler's (2002) review are very similar. Both conclude that repeated reading interventions are associated with gains in reading fluency including reading rate and accuracy, as well as reading comprehension. However, the syntheses also have one common limitation: the interpretation of the repeated reading intervention results are confounded by the variance in comparison samples. Chard, Vaughn, and Tyler (2002) state a major qualification of the results,

> Before interpreting the findings of the present synthesis, it is important to note that effect sizes can be considered only within the context of the comparisons with which treatment groups were contrasted. Because effect sizes are largely dependent on the nature of the comparison groups, it is critical that a synthesis include detailed information regarding the comparisons… However, comparison groups differ considerably across samples, complicating the interpretation of the findings. The interpretations that follow were developed with this limitation in mind (p. 402).

The main difference between the two research syntheses is in terms of specificity. The NRP (NICHD, 2000) report made sweeping generalizations about the findings of repeated reading and guided repeated reading interventions for a wider range of students. In contrast, Chard, Vaughn and Tyler's synthesis provided a more detailed analysis and description of the features of effective interventions which promote reading fluency for elementary students with LD. Consequently, yet again it is difficult to grasp the substance of the term, reading fluency and the factors that affect its development.

Reading Fluency Research Synthesis: Kuhn and Stahl (2003)

Similar to the NRP report (NICHD, 2000), Kuhn and Stahl's (2003) research review on fluency included both a theoretical and an empirical component. The theoretical component included a review of the reading research literature with particular emphasis on the importance of fluency in the reading process. The empirical component examined the research literature on specific approaches used to improve reading fluency. They contended that the conclusions from the NRP report were limited in scope and application, "…the studies reviewed by the NRP were so wide ranging that one can only draw the broadest of conclusions about the effectiveness of fluency-oriented instruction from their meta-analysis" (p. 6). Consequently, Kuhn and Stahl focused their review on particular types of approaches for developing children's reading fluency.

Theoretical Framework

Kuhn and Stahl (2003) provided a brief overview of two important theories of reading including Chall's (1996) stages of reading development and Ehri's (1995, 1998) phases of sight word development as the basis for their conceptualization of reading fluency. Chall (1996) suggested a continuum of six stages of reading. The early reading or emergent literacy stage involves the development of foundational literacy skills including concepts of print, phonemic awareness, book-handling skills, and recognition that print carries meaning. The second stage marks the beginning of conventional literacy development including sound-symbol correspondences and decoding accuracy with deliberate and effortful decoding. The third stage, confirmation and fluency, which Chall (1996) referred to as the "ungluing from print" (p. 8), is the focus of Kuhn and Stahl's (2003) review. During this stage, reading fluency develops as readers consolidate

decoding skills and increase automaticity with print. It is a time when reading sounds increasingly more natural and conversational as the reader focuses on the prosodic features of text through phrasing, stress, and intonation. The development of fluency and automaticity are necessary for the reader to focus on understanding and constructing meaning from text. The fourth stage is "reading for learning the new" which involves expanding knowledge and understanding from text. The fifth stage involves readers in considering and critically analyzing "multiple viewpoints" in texts on a particular topic. The final stage of Chall's theory is "construction and reconstruction" which involves synthesizing multiple perspectives from texts to arrive at a unique and personal perspective.

Ehri (1995, 1998) proposed a continuum of four developmental phases towards automatic sight word recognition. Sight words are defined as "all words that have been recognized accurately on several occasions" (Kuhn & Stahl, 2003, p. 4). Ehri suggested that in order for words to be recognized instantly and automatically as sight words, the reader must establish a mental representation of the orthographical structure of the word. With increased exposure to the word, readers gradually expand their conceptualization of the word to include its spelling, pronunciation, and meaning. The four phases of sight word development include: the pre-alphabetic phase; the partial alphabetic phase; the alphabetic phase; and the consolidated alphabetic phase. The pre-alphabetic phase maps onto Chall's (1996) early reading stage which suggests that the reader relies on a visual cue in which sight word recognition is contingent upon memory recall of the visual representation of the word and how the word is pronounced and/or what it means. At this beginning point, letter-sound recognition is not yet developed. During the partial

alphabetic phase, readers apply basic sound-letter correspondence to identify words. The full alphabetic phase draws upon the reader's increased phonological awareness and decoding ability to generalize familiar spellings to identify new and unfamiliar words. The reader makes connections between graphemes and phonemes in conventional spellings and begins to establish a core group of sight words that are recognized automatically including words with irregular phonetic spellings. The consolidated alphabetic phase corresponds to Chall's (1996) confirmation and fluency stage of reading. During this phase, the reader develops increased understanding of the orthographic system and begins to recognize familiar letter patterns as holistic units within words. The reader recognizes many words accurately and automatically. Kuhn and Stahl (2003) adopted the theoretical frameworks of Chall (1996) and Ehri (1995, 1998) as the basis for their view of how reading fluency develops.

Kuhn and Stahl (2003) presented three main components of reading fluency which affect a reader's ability to understand and interpret text: decoding accuracy; word recognition automaticity; and prosodic features of text including phrasing, stress, and pitch. They focused their discussion on two of the three components in order to examine the contribution of automaticity and prosody to reading comprehension. Automaticity is an important factor related to comprehension. Kuhn and Stahl (2003) argued that a reader must establish proficient and automatic word recognition skills to be able to focus their available cognitive resources on constructing meaning while reading text. To achieve accurate and automatic word recognition, a reader needs extensive exposure to text with multiple opportunities for practice. LaBerge and Samuels (1974) explained automaticity as the ability to complete a process without conscious effort or attention. Their theory of

automaticity supports two aspects including the rate and accuracy of decoding as important contributors to reading fluency and comprehension. Kuhn and Stahl (2003), however, argue that although accuracy and automaticity of word recognition are necessary to reading fluency, they are not sufficient to ensure fluency.

Subsequently, Kuhn and Stahl (2003) highlighted the important role of prosody in the reading process which stresses that reading fluency involves more than just decoding words accurately at a sufficient rate. They point out that fluent, expressive reading requires attention to the "tonal and rhythmic aspects of language" (p. 5). Based on the contributions of Allington (1983), Dowhower (1991), and Schreiber (1980, 1987, 1991), Kuhn and Stahl (2003) provide this description, "prosody comprises a series of features including pitch or intonation, stress or loudness, and duration or timing, all of which contribute to an expressive rendering of the text" (p. 5). They suggest that prosody provides an important link between reading fluency and the construction and interpretation of meaning from text.

According to Dowhower (1987, 1991), there are six indicators or markers of prosodic reading: pausal intrusions; length of phrases between pauses; syntactically and phonologically acceptable phrases; duration of final words in phrases; the change of pitch at final punctuation markers; and, stress or accent on particular words or phrases to indicate importance. Readers draw upon their intuitive understanding of the syntactic and semantic structure of language and how speech sounds in order to read fluently and to interpret and understand the meaning of text. Kuhn and Stahl (2003) suggest that reading with appropriate phrasing, intonation, and stress are important prosodic indicators of not just fluent reading, but comprehension as well. I turn now to discuss the major points

from Kuhn and Stahl's review of the experimental research on instructional approaches for fluency.

Review of Experimental Research

Kuhn and Stahl (2003) searched the ERIC and PsycLIT databases for studies that "focused on evaluating strategies designed to promote readers' fluency development, such as the development of either the automaticity or prosodic components of fluent reading or some combination of the two" (p. 7). Their review was based on a corpus of 71 studies comprised of: 58 studies of assisted reading, repeated reading or classroom interventions; nine studies of approaches focused on segmenting text into meaningful phrases; and four studies of isolated speeded word recognition practice. Of the 71 studies included in this review there were 31 overlapping studies with Meyer and Felton's report (1999), the NRP report (NICHD, 2000), and Chard, Vaughn, and Tyler's (2002) review (Carver & Hoffman, 1981; Dowhower, 1987; Gilbert, Williams, & McLaughlin, 1996; Herman, 1985; Hollingsworth, 1970, 1978; Homan, Klesius, & Hite, 1993; Langford, Slade, & Burnett, 1974; Levy, Abello, & Lysynchuk, 1997; Mathes & Fuchs, 1993; Mefford & Pettegrew, 1997; O'Shea, Sindelar, & O'Shea, 1985; Rashotte & Torgesen, 1985; Rasinski, 1990; Simmons et al., 1995; Spring, Blunden, & Gatheral, 1981; Stoddard et al., 1993; Sutton, 1991; Tingstrom, Edwards, & Olmi, 1995; Turpie & Pastore, 1995, Van Bon et al., 1991; Weinstein & Cooke, 1992; Young, Bowers, & MacKinnon, 1996). Most of the overlapping studies included approaches for repeated reading and assisted reading. In total, data from 40 additional studies were considered as part of my review. The studies used a number of outcome measures including accuracy, rate, prosody and comprehension to determine whether the intervention resulted in

improvement in reading. The 58 studies of assisted reading, repeated reading and classroom interventions included 33 studies of repeated reading, 15 studies of assisted reading, and 10 studies of classroom interventions. Of these 58 studies, only 26 studies included control groups. The data from these studies was not conducive to a meta-analysis because the body of research lacked control groups and contained widely variable effect sizes and control conditions. Kuhn and Stahl (2003) emphasized that the prevalence of single or multiple baseline studies which monitor effects over time was quite problematic. Nevertheless, they conducted a qualitative synthesis of the research and a two-vote system was used to judge effective, non-effective, and interactive effects for the 15 studies. The first vote was based on whether there was evidence of repeated reading effectiveness on reading fluency and comprehension and the second whether multiple comparisons within the studies showed differences between the intervention and control groups. They divided the empirical research of fluency instruction into two main categories. The first category included fluency intervention approaches targeted for remediation of children who experience reading difficulties in clinical contexts. The second category was comprised of fluency instructional approaches designed for classroom application. The major findings are presented next.

Remedial Fluency Instruction

Remedial interventions for reading fluency are divided into two categories: unassisted repeated reading and assisted reading strategies. Unassisted repeated reading involves opportunities for students to read text repeatedly and independently. Assisted reading strategies involve repeated reading with a model of fluent reading (Dowhower, 1989). Both types of interventions were designed for students who experience reading

difficulties to practice reading in order to improve accuracy, automaticity, prosody, and comprehension of text.

Unassisted repeated reading intervention studies. Similar to the descriptions provided in other reviews of repeated reading (Chard, Vaughn, & Tyler, 2002; Meyer & Felton, 1999; NICHD, 2000), unassisted repeated reading entailed repeatedly reading text for a specified number of times, or to a predetermined rate and/or accuracy criterion (evaluated as words per minute or words correct per minute). Data from thirty-three repeated reading studies between 1979 and 1996 were examined for their effect on reading fluency and comprehension (Bell, Markley, & Yonker, 1990; Bohen, 1988; Carver & Hoffman, 1981; Dahl, 1979; Dowhower, 1987; Hannah, 1994; Herman, 1985; Homan, Klesius, & Hite, 1993; Knupp, 1988; Koch, 1984; Koskinen & Blum, 1984; Levy, Barnes, & Martin, 1993; Levy et al., 1986; Mathes & Fuchs, 1993; O'Shea, Sindelar, & O'Shea, 1985, 1987; Person & Burke, 1984; Rashotte & Torgesen, 1985; Rasinski, 1990; Simmons et al., 1995; Stoddard et al., 1993; Tingstrom, Edwards, & Olmi, 1995; Turpie & Pastore, 1995, Van Bon et al., 1991; van der Leij, 1981; Weinstein & Cooke, 1992; Young, Bowers, & MacKinnon, 1996). Of these 33 studies, only 15 had control groups. Most of these studies included students in grades two and three, or older students with reading difficulties.

The result of two vote-counting procedures found that "repeated reading did not produce significantly greater achievement than a control" (Kuhn & Stahl, 2003, p. 8). However, they reported that the type of control condition resulted in very different outcomes depending on whether it involved no-treatment or reading the same amount of text in a sustained manner. They also reported that the low number of repeated reading

studies with a control group did not provide sufficient data to evaluate the effectiveness of repeated reading for a set number of times or to a predetermined criterion. Kuhn and Stahl (2003) reported that the data from six repeated reading studies suggested that more difficult text may lead to greater gains in reading achievement. However, they suggested that more research is necessary in order to study the effects of text difficulty on reading fluency. In general, they found that studies which showed an increase in fluency also showed an increase in comprehension, with the exception of Carver and Hoffman (1981) and Dahl (1979). In these studies, students made gains on cloze measures of comprehension, but not on more global measures of comprehension (i.e., standardized tests).

Assisted reading strategies. Kuhn and Stahl (2003) analysed the data from 15 studies of assisted reading between 1965 and 1997, only seven included control groups (Carbo, 1978; Chomsky, 1978; Dowhower, 1987; Eldredge, 1990; Gardner, 1965; Gilbert, Williams, & McLaughlin, 1996; Heckelmann, 1969; Hollingsworth, 1970, 1978; Langford, Slade, & Burnett, 1974; Mefferd & Pettegrew, 1997; Rasinski, 1990; Richek & McTeague, 1988; Strong & Traynelis-Yurek, 1983; Young, Bowers, & MacKinnon, 1996). The studies used several different remedial intervention strategies including neurological impress method or assisted reading (Heckelman, 1969), reading-while-listening, and closed-caption television. The neurological impress method, sometimes referred to as *assisted reading*, involves an adult and student reading simultaneously while tracking the text. The adult sits slightly behind the student and reads the text into the student's ear. Reading-while-listening is an assisted reading approach in which students repeatedly read along with audiotapes of text until they are able to read the text

fluently on their own. Another approach engaged students in reading closed-caption television programs as a way to practice reading fluently. The vote-counting analysis of the data from these assisted reading studies showed that five of seven studies with a control group resulted in positive significant differences in favour of assisted reading approaches. In addition, there were significant treatment effects for six of nine comparisons. Kuhn and Stahl (2003) emphasized that the key factor of listening-while-reading using audiotapes is holding students accountable for reading the text fluently (e.g., Carbo, 1981; Chomsky, 1978).

Dowhower (1987) compared the effects of repeated reading and listening-while-reading for a group of grade two readers who were transitioning from the decoding stage to the fluent stage (Chall, 1996). Students in both conditions were required to read the texts repeatedly until they reached a set criterion. Dowhower found that both approaches resulted in significant gains in rate, accuracy, and comprehension with transfer to unfamiliar texts and increased improvement over a series of passages. However, the students in the listening-while-reading intervention showed more improvement on measures of prosody. Rasinski (1990) also compared the effects of repeated reading and listening-while-reading for third grade students on reading rate and accuracy. He found that although students in both groups made significant improvement in reading rate and accuracy, there were no significant differences reported between the two conditions.

Classroom Fluency Instructional Approaches

Kuhn and Stahl (2003) examined 10 studies of classroom approaches to fluency instruction only four used control groups (Eldredge & Quinn, 1988; Hoskisson & Krohm, 1974; Koskinen & Blum; 1984; Labbo & Teale, 1990; Morris & Nelson, 1992; Ramunda,

1994; Rasinski et al., 1994; Reutzel & Hollingsworth, 1993; Reutzel, Hollingsworth, & Eldredge, 1994; Stahl et al., 1997; Sutton, 1991). These studies are divided into two categories: classroom extensions of assisted reading and integrated fluency lessons.

Classroom extensions of assisted reading. The classroom assisted reading approaches included several variations of repeated reading in the context of partner reading (two students with the same or different reading levels read a text together) (Eldrdege & Quinn, 1988; Hoskisson & Krohm, 1974; Koskinen & Blum, 1984) and cross-age tutoring (older readers are paired with younger readers to read a text together) (Labbo & Teale, 1990; Ramunda, 1994; Sutton, 1991). The partner reading approaches provided additional feedback and support for the reader. Results from the partner reading studies showed that the grade two and three below average readers showed significant improvement in reading fluency. The results of the cross-age tutoring approaches showed that cross-age tutoring seemed most beneficial for the tutors who were reading below-grade level, than for tutors who were reading above grade level.

Integrated fluency lessons. The most prevalent type of integrated fluency lesson is the oral recitation lesson (ORL) developed by Hoffman (1987). The five basic components of ORL include: the teacher models reading a story fluently with prosody and expression; a class discussion of the content of the text; teacher and students echo read the story (teacher reads a paragraph followed by the students echoing back the paragraph); students are assigned portions of the text to practice reading until they reach a set rate and accuracy criterion; and students read the passage aloud to the class. Several studies examined the effect of variations of ORL on reading fluency. Reutzel and Hollingsworth (1993) conducted a study to compare the effects of the ORL to traditional

round-robin reading approach. Subsequently, Reutzel, Hollingsworth, and Eldredge (1994) conducted a study comparing ORL to a shared-book experience (Holdaway, 1979) (which involves the teacher and students in reading a common text together). Morris and Nelson (1992) examined the effects of ORL with a group of struggling second-grade readers using a baseline design. Rasinski and his colleagues (1994) compared the effectiveness of a fluency development lesson based on ORL to a comparison group who received traditional literacy activities. Furthermore, Stahl and his colleagues (1997) examined the effects of a fluency-oriented reading instruction program which incorporated repeated reading into a second grade classroom. The program included a redesigned basal reading lesson; a free-reading period during school time; and a home reading component. Of the three controlled studies, the vote counting analysis found only one study which showed significant improvement in reading achievement favouring the fluency-oriented lessons (Stahl et al, 1997) over traditional instruction or a shared-book experience. Although Kuhn and Stahl (2003) considered the effects of classroom-based integrated fluency lessons to be suggestive, they maintained that more controlled research was necessary to examine the effectiveness of these types of classroom approaches on fluency development. Kuhn and Stahl (2003) pointed out that the results from many fluency intervention studies did not show gains on measures of isolated word recognition (Dahl, 1979; Dowhower, 1989; McFalls, Schwanenflugel & Stahl, 1996) which they viewed as ironic because word recognition is one of the primary goals of most fluency approaches.

To examine which aspects of repeated reading and assisted reading led to gains in comprehension, Kuhn and Stahl (2003) reviewed intervention studies of isolated word

recognition and text segmentation. They wanted to know whether the gains in comprehension could be attributed solely to increased word recognition or whether there was something more specifically related to reading connected text that supported comprehension. They reviewed four studies of interventions that focused on isolated word recognition, three of which, overlapped with Meyer and Felton's (1999) report (Fleisher, et al., 1979-1908; Levy, Abello, & Lysynchuk, 1997; Spring, Blunden, & Gatheral, 1981; Tan & Nicholson, 1997). Similar to Meyer and Felton (1999), Kuhn and Stahl (2003) found that isolated word recognition resulted in improvements to passage reading fluency, however, there were no differences between the treatment and control groups on measures of comprehension. Consequently, they concluded that rate of word recognition was not the sole factor which contributed to comprehension gains in repeated reading and assisted reading approaches. In addition, they considered the results from several studies that examined the effects of presenting segmented text in meaningful phrases on comprehension (Cromer, 1970; O'Shea & Sindelar, 1983; Schreiber, 1980, 1987). These studies found that student comprehension increased as a result of parsing the text into phrasal units for students in the primary grades and fourth grade and higher. Just as prosody aids the understanding of oral language, Kuhn and Stahl (2003) contend that segmenting text facilitated reading comprehension. Overall, many approaches including repeated reading, assisted reading, and segmenting text into phrasal units showed positive gains in comprehension, with the exception of practices focused on speeded recognition of isolated words. Based on their analysis, Kuhn and Stahl (2003) concluded,

> …we would argue that it is more than simply automaticity and accuracy that allow this understanding to develop. Further, the discussion surrounding prosody as a necessary component in children's ability to understand oral language and its role in language acquisition all add to the argument that prosody is equally necessary to developing understanding of written text. Finally, given that fluent oral reading is considered to be expressive as well as quick and accurate and that prosodic features are, to a large extent, responsible for such expression, it is important to consider a definition of fluency that encompasses more than rate and accuracy (p. 18).

They concluded that a range of repeated reading, assisted reading and classroom fluency instruction proved effective for improving reading rate, accuracy and comprehension of connected text. They cautioned that it is not clear whether these approaches are more effective than traditional instruction as a result of the specific types of instructional activities or the increased the amounts of reading. They suggested that repetition and modeling provided the necessary practice and support for developing fluent reading. They noted that there is some evidence to suggest that increasing the amount of sustained reading may be more important than repetitive practice on the same text (Homan, Klesius, & Hite, 1994); Mathes & Fuchs, 1993; Rashotte & Torgesen, 1985; van Bon et al., 1991). In addition, they concluded that fluency approaches were most beneficial for readers transitioning from the decoding stage to the fluent and confirmation stage of reading development (Chall, 1996) and older struggling readers who have yet to develop reading fluency. In relation to reading level, fluency instruction seemed most suitable for students who were reading between late preprimer and late

grade two. Ultimately, students need to establish a foundation of sight words and decoding skills to benefit from fluency instruction. In the future, they emphasized that it would be important to examine several other aspects of fluency instruction: the differences between repetitive reading and increased amounts of reading and whether both approaches would lead to similar results; the effects of text difficulty on reading fluency and learning; the aspects of fluency instruction which account for its effects; and the relationship between improved fluency and comprehension.

There is considerable overlap between the Kuhn and Stahl review (2003) and others, nonetheless, there are some noteworthy distinctions. Their review focused on the role of prosody as an important component of reading fluency and comprehension and the others did not. Their review was precise and questioned specifically whether, even in the studies that show improvement in reading fluency, the gains were due to the instructional techniques per se or the increased reading; along the same line, they queried whether it was the increased reading rather than repeated reading that led to change; and finally, they were the first to point to the possibility that there may be a strategic time to engage in reading fluency instruction, namely, between late preprimer and late grade two.

Reading Fluency Research Synthesis: Therrien (2004)

Therrien (2004) conducted a meta-analysis of repeated reading studies to address three questions: "(1) Is repeated reading effective in increasing reading fluency and comprehension? (2) What components within a repeated reading intervention are critical to the success of the program? (3) Do students with cognitive disabilities benefit from repeated reading?" (p. 253). He established the following selection criteria for his database search of ERIC and PyscInfo: (a) studies examining the effects of repeated

reading between 1977 and June 2001, (b) studies using experimental and quantitative research designs, and (c) studies of school-age participants (i.e., ages five to 18 years). His meta-analysis was based on 18 studies of repeated reading (Bryant et al., 2000; Dowhower, 1987; Faulkner & Levy, 1999; Herman, 1985; Homan, Klesius, & Hite, 1993; Levy, Abello, & Lysynchuk, 1997; Mathes, & Fuchs, 1993; Mercer et al., 2000; O'Shea, Sindelar, & O'Shea, 1985, 1987; Rasinski, 1990; Rasinski et al. 1994; Simmons et al., 1994; 1995; Sindelar, Monda, & O'Shea, 1990; Stoddard et al., 1993; Vaughn, et al, 2000; Young, Bowers, & MacKinnon, 1996). Only two studies were not included in previous reviews (Bryant et al., 2000; Mercer et al. 2000), thus with a few exceptions, little new is offered to advance either conceptual or theoretical clarity to reading fluency. Therrien (2004) analysed effect sizes for fluency and comprehension. Measures of fluency included reading speed calculated as the number of words correct per minute (wcpm) or words per minute (wpm). Measures of comprehension included story retelling measures or the number of correct responses to comprehension questions. One of the main differences between Therrien's and previous reviews of repeated reading interventions is his analysis of the components of repeated reading in two distinct categories: nontransfer measures (measures of reading fluency and comprehension on a previously practiced text) and transfer measures (measures of reading fluency and comprehension on an unpracticed text). The major findings are presented next.

Component analysis of repeated reading: Nontransfer studies

To analyse the effectiveness of repeated reading, Therrien calculated effect sizes for all repeated reading studies with nontransfer measures of fluency and comprehension. In addition, he analysed the studies which provided separate data for nondisabled

students and students with learning disabilities to determine whether repeated reading increased fluency and comprehension for students with and without learning disabilities. Students with learning disabilities were identified by the school, school district, or state guidelines.

Therrien (2004) calculated 28 (sic) nontransfer effect sizes including 16 fluency measures and 11 comprehension measures. Across all nontransfer measures, mean effects for fluency was 0.83 and comprehension was 0.67. The mean fluency and comprehension effect size for students without learning disabilities on nontransfer measures was calculated as 0.85 and 0.64, respectively, and the mean fluency and comprehension effect size for students with LD was calculated as 0.75, and 0.73, respectively. No specific information was provided about the characteristics of the students who received the interventions in terms of age, grade level, or the number of students with or without disabilities. Therrien analysed the nontransfer repeated reading interventions based on three instructional components: cued reading; corrective feedback; and performance criteria.

Cued reading. Effect sizes were calculated for cued reading on fourteen studies of nontransfer measures of fluency and comprehension. Students are cued prior to reading to focus on speed, comprehension, or both. For students cued to focus on speed, Therrien (2004) found mean effect sizes for fluency of 0.72 and comprehension of 0.66. For students cued to focus on comprehension, he found a mean fluency effect of 0.81 and a mean comprehension effect of 0.75. For students cued to focus on both speed and comprehension, he reported a mean fluency effect size of 0.94 and a mean comprehension effect size of 0.67.

Corrective Feedback. Effect sizes were calculated for three nontransfer measures of fluency. Corrective feedback involved an adult or peer correcting the reader's mispronunciations and reading errors. A moderate mean fluency effect size of 0.68 was calculated for students who received corrective feedback and a large mean effect of 0.88 was reported for students who did not receive corrective feedback.

Performance Criteria. Performance criteria employed a fixed number of readings, typically two, three or four repeated readings. Based on 27 of 28 nontransfer effect sizes, a mean fluency effect size of 0.81 and a mean comprehension effect size of 0.66 were calculated for these interventions. The fluency mean effect sizes for two repeated readings was 0.57; three repeated readings was 0.85; and four repeated readings was 0.95. No comprehension effects data were provided for students reading text twice. However, the mean comprehension effect sizes for three and four repeated readings was 0.66 and 0.71, respectively.

Overall, Therrien (2004) found a large mean effect size for fluency (0.83) and a moderate effect size for comprehension (0.67) across the nontransfer studies. The component analysis of nontransfer measures showed that repeated reading is an effective intervention for improving reading fluency and comprehension on text that is read repeatedly. Consistent with other reviews, he concluded that students with and without learning disabilities repeatedly reading the same text ultimately resulted in improved fluency and comprehension for that passage.

Component analysis of repeated reading: Transfer studies

The transfer studies included students with and without learning disabilities. Therrien calculated effect sizes for all of the studies with transfer measures and then

analysed those studies which provided separate data for students with and without learning disabilities. He calculated 27 transfer effect sizes including 16 fluency measures and 11 comprehension measures. An analysis of all transfer measures resulted in a mean effect size for fluency and comprehension of 0.50 and 0.25, respectively. The average intervention time was 36 sessions with the exception of Vaughn, Chard, Bryant, Coleman, and Kouzekanani (2000), which lasted one to three years. The mean fluency and comprehension effects on transfer measures for students without disabilities were 0.59 and 0.18, respectively and for students with LD were 0.79 and 0.41, respectively. Therrien (2004) analysed six instructional components of repeated reading interventions: adult or peer instructor, modeling, corrective feedback, performance criteria, comprehension, and charting. No specific information was provided about student age, grade, or the number of students in the studies with or without learning disabilities.

Adult or Peer Interventions. For interventions conducted by adults, the fluency and comprehension mean effect sizes were 1.37 and 0.71, respectively. For students in interventions conducted by peers the mean fluency and comprehension effect size was 0.36 and 0.22, respectively. Only one study by Simmons and his colleagues (1995) found that their peer intervention resulted in a somewhat higher effect size for comprehension of 0.75 over the adult-run interventions. As a result of the discrepancy between programs that were run by adults as opposed to peers, Therrien (2004) separated the effect sizes for adult- and peer-run interventions for the remaining repeated reading components.

Modeling. Therrien (2004) calculated 11 transfer effect sizes of interventions that provided a model of fluent reading which involved a peer tutor reading the passage fluently prior to the tutee reading the text. These interventions produced a mean fluency

effect size of 0.40 and a mean comprehension effect size of 0.10. Other interventions that did not include a model of reading resulted in a mean fluency effect size of 0.30 and a mean comprehension effect size of 0.45. Therrien (2004) reported a fluency effect size of 1.0 for an intervention study with a model (Rasinski et al, 1994) that lasted for 120 days compared to a mean of 0.30 for interventions without a model. The average intervention duration for the other interventions was 32.4 days. Thus, raising the question whether the model intervention was effective because of intensity rather than the design (model intervention).

Corrective Feedback. Corrective feedback was calculated for 23 of the 27 transfer effect sizes. During interventions with corrective feedback, students were either given the correct pronunciation, or cued to sound out or reread the word. A mean fluency effect size of 0.51 and a mean comprehension effect size of 0.23 were reported for students who received corrective feedback. In addition, a fluency mean effect of 0.46 and a comprehension effect size of 0.52 were reported for students who did not receive corrective feedback. When peer-run interventions were excluded from the analysis, the mean effects on fluency were reported as 1.37.

Performance Criteria. Performance criteria for transfer interventions consisted of either a fixed number of readings or a set criterion determined as number of correct words per minute, or the completion of a reading within a predetermined time period. For interventions with a performance speed criterion, a relatively large mean fluency effect size of 1.70 was calculated. For interventions that used a fixed number of readings, a mean fluency effect size of 0.38 was reported. The mean effects for two repeated readings of unpracticed text were reported as 0.37 for fluency and 0.03 for

comprehension. For transfer interventions that required three readings of the text, the mean fluency effect size was reported as 0.42 and mean comprehension was 0.49. Data were not available to calculate comprehension effect sizes for interventions with a performance speed criterion.

Comprehension Component. Twelve effect size calculations were derived from comprehension questions or a paragraph summary in peer-run transfer interventions. The peer-run interventions that included a comprehension component recorded a mean fluency effect size of 0.39 and a mean comprehension effect size of 0.28. Other peer-run interventions that did not include a comprehension component recorded a mean fluency effect size of 0.33 and a mean comprehension effect size of 0.14.

Charting. Therrien (2004) reported 14 effect sizes for interventions that involved charting student progress (no description was provided, however charting appears to be recording and graphing students' progress over time for reading accuracy and rate (wcpm) and for answers to comprehension questions). For interventions that included charting, a mean fluency effect size of 0.57 and a mean comprehension effect size of 0.11 were reported. For interventions that did not include charting, a mean fluency and comprehension effect size was reported as 0.40 and 0.44, respectively. In addition, a mean fluency effect size of 1.58 was calculated for adult-run interventions which involved charting student progress. However, no data were provided on adult-run interventions to calculate comprehension effects.

Results from the transfer studies showed a moderate increase of the mean fluency effect size (0.50) and a somewhat smaller, but still significant, mean effect size for comprehension (0.25). Overall, these results indicate that repeated reading interventions

are modestly effective at improving fluency and less so for comprehension of new and unpracticed texts for students with and without learning disabilities.

When Therrien (2004) analysed the studies to determine whether repeated reading increased fluency and comprehension for students with LD and students without disabilities, he found that the overall mean effects of repeated reading on fluency for students with and without learning disabilities were 0.76 and 0.77, respectively. The mean effects of repeated reading on comprehension for students with and without learning disabilities were 0.48 and 0.59, respectively. Results from these meta-analyses show that transfer and nontransfer measures of repeated reading interventions have generally moderate effects on reading fluency and comprehension both for students with and without learning disabilities.

In conclusion, Therrien (2004) identified several essential components of repeated reading based on the results from his meta-analysis. Repeated reading interventions implemented by adults are more effective than peer-run interventions regardless of whether students are reading the same text repeatedly or reading a range of texts. Provide opportunities to read aloud to an adult. Use cues prior to reading to focus on speed, comprehension, or both, in order to aid students in reading passages fluently with comprehension. Finally, he advised that to achieve optimal benefits for fluency and comprehension when reading the same text, have students reread text three or four times. Therrien (2004) also concluded that corrective feedback and explicit performance criteria are necessary components of repeated reading in order to improve overall fluency and comprehension. However, it is important to point out that the effect sizes for corrective

feedback and performance criteria on transfer and nontransfer measures did not bear out this conclusion.

Four significant limitations confound the results of this meta-analysis. First, the studies did not provide sufficient information to be able to determine the particular characteristics of students (i.e., reading level) who may benefit most from repeated reading. Second, the studies did not include adequate information about the type of text and level of text difficulty for repeated reading. Third, there is a need for more research on transfer repeated reading interventions to determine the effect of including components such as charting student progress and comprehension questions or story retelling. The fourth and final limitation mentioned by Therrien (2004) is less-than-robust research designs which has been identified in most other reviews of repeated reading interventions. He cautions that much of the research used for his analysis was based on pretest-posttest comparison studies. He acknowledged that without control groups, it is difficult to interpret the exact nature of the relationship between certain components of repeated reading and their effects on reading fluency and comprehension. Similar to others, Therrien (2004) also calls for controlled research of repeated reading in the future. There was considerable overlap between the studies included in this and other reviews of repeated reading interventions (Chard, Vaughn, & Tyler, 2000; Meyer & Felton, 1999; NICHD, 2000; Kuhn & Stahl, 2002). Although Therrien's (2004) component analysis of repeated reading on fluency and comprehension effects for transfer and nontransfer studies was different from previous reviews, his results and conclusions did not offer new insights. In fact, his meta-analysis again signals, as do all of the others, the need for

robust studies using matched control groups, and confirms the fairly consistent lack of improvement on reading comprehension, the ultimate aim of reading instruction.

Reading Fluency Intervention Studies Since 2004

Since the publication of Therrien's (2004) meta-analysis, my database search uncovered only two experimental studies of reading fluency interventions (Kuhn, 2005; O'Connor, White, & Swanson, 2007). These treatment-comparison studies were designed to evaluate the effect of different reading instructional methods on reading fluency. Both studies focused on students with reading difficulties, Kuhn worked with second graders and O'Connor and his colleagues worked with second and fourth graders. These studies are of particular interest because second grade seems to be a pivotal transitional period for reading development when students progress from a stage of intentional and deliberate decoding to fluent reading (Chall, 1996; Stahl & Heubach, 2006). Unfortunately, neither study complies with calls from previous reviews for well-designed, robust research with increased controlled conditions, larger samples of students with and without reading difficulties, and longer interventions with follow-up over an extended period of time. In both cases, the sample sizes are small and the treatment conditions are varied. As a result, the findings offer little new insight about the construct of reading fluency and therefore they are discussed briefly in the next section.

The purpose of Kuhn's (2005) study was to "explore the relative effectiveness of a repeated-reading strategy and a non-repetitive (wide) reading strategy on the reading development of students making the transition from intentional decoding to fluent reading" (p. 138). The primary goal was to determine whether repeatedly reading the same text and reading equivalent amounts of connected text would produce comparable

effects on reading fluency using measures of word recognition accuracy, automaticity, prosody, and comprehension. She acknowledges the importance of comprehension, "fluent reading consists of more than simply reading words accurately and automatically; it also incorporates those elements that make for an expressive and meaningful rendering of a text" (Kuhn, 2005, p. 128). Automatic word recognition and reading prosody are central to the process of constructing meaning from text, fluency thus plays an important role in comprehension.

Kuhn studied twenty-four grade two students (14 girls, 10 boys) identified as dysfluent readers based on the results of an informal oral reading assessment using the *Qualitative Reading Inventory* (QRI) (Leslie & Caldwell, 1988) and an oral reading fluency assessment using the NAEP *Oral Reading Fluency Scale* (Pinnell et al., 1995). The dysfluent readers were randomly assigned to one of three treatments or the control condition. The Repeated Reading condition required students to repeatedly read six different texts over the course of the intervention which included many different components: modeling; repetition; positive feedback; echo reading (teacher reads sections of text and students echo back the text); choral reading (teacher and students read the text simultaneously); partner reading (two students taking turns reading the text); and independent oral reading performance (each student rereads a portion of the text to the group). The Non-Repetitive Reading condition required students to read eighteen different texts (six texts overlapped with the Repeated Reading treatment) using the methods of echo and choral reading of text. The third treatment, the Listening-Only condition was introduced to control for the Hawthorne effect in which students listened to an expressive rendition of the same eighteen texts used in the second condition read aloud

by the researcher. The Control Group did not receive any additional instruction and was intended to control for the different instructional strategies that occurred across the three second grade classrooms. Interventions were carried out over 18 sessions of 15-20 minutes, three days per week for six weeks. On average, each group received a total of 4.5 to 6 hours of intervention. Data from pretest and posttest measures of isolated and contextual word recognition, oral reading fluency rating scale, oral reading rate, and comprehension were collected to identify near (fluency) and far (comprehension) transfer. Data were collected on 23 of the 24 students.

The results showed that students in the repeated reading and non-repetitive reading conditions made greater gains than the students in the listening only and control groups on a number of measures including: the number of words read in isolation; the number of correct words read per minute in context at their instructional reading levels; and oral reading with fluency and prosody. However, on measures of comprehension, only students in the non-repetitive reading group showed improvement.

Based on these results, Kuhn (2005) concluded that repeated reading might be more effective for targeting automaticity and prosody of reading while non-repetitive reading may be more effective for integrating a number of skills including: word recognition accuracy and speed, reading prosody, and comprehension. Given the small scale of the Kuhn study and the lack of improvement in reading comprehension, it is unclear what, if anything, is new in her findings. She did however, include prosody as an important dimension of reading fluency and Kuhn's study (2005) is one of the few to include prosodic features of oral reading in an analysis of reading fluency growth.

O'Connor, White and Swanson (2007) examined the effects of repeated reading and continuous reading on the development of reading fluency, namely: "How does repeated reading compare with continuous reading for improving the reading rate and overall reading outcomes of struggling readers? They identified several features of reading fluency including "rate of reading, prosody, and attention to punctuation, all of which intersect to bring words on a page to life" (p. 31). Their research focused primarily on oral reading rate because previous research found a strong relationship between reading rate and reading comprehension in the elementary years (O'Connor et al., 2002; Rupley, Willson, & Nichols, 1998; Spear-Swerling & Sternberg, 1994). They proposed, "Therefore, the motivation for improving reading rate is the possibility that rate might enable improved reading comprehension" (pp. 31-32) on the grounds that if interventions could improve reading rate for struggling readers, then comprehension of text would also show improvement. Measures of oral reading rate were used to examine the effectiveness of two intervention methods on reading fluency for struggling readers as well as measures to assess growth in receptive vocabulary, word identification, and comprehension.

Thirty-seven poor readers were identified by O'Connor, White, and Swanson from four classes of second (16) and fourth (21) graders using specific performance criteria based on a measure of reading rate and receptive vocabulary. Reading rate performance criteria for inclusion in the study was set at 12 to 45 words per minute on a graded passage for grade two and 20 to 80 words per minute for grade four. All students had to achieve a standard score of 69 or higher on the *Peabody Picture Vocabulary Test*

(PPVT-III; Dunn et al. 1997). Sixteen of 37 students in the study were previously diagnosed with a learning disability.

The study included four conditions: two treatments, a control, and a group of average second and fourth graders. The poor readers were randomly assigned to one of two treatment conditions or to the control group. A fourth group (16) of average second and fourth graders served to compare the progress of poor readers with students who showed average growth in reading rate and other reading skills.

In the two treatment conditions, students read text at their instructional level in a one-to-one tutoring context with a trained adult listener for 15 minutes, three days per week, for 14 weeks. Students in the repeated reading condition read each page of text three times while those in the continuous reading condition read more pages in the designated text to the adult listener during the fifteen minute period. The adult listeners assisted readers by providing unknown words and correcting errors and recording student performance: the text and number of pages read, the time spent reading, the total number of error corrections, and words provided to the student during each session.

Pre-, mid-, and post-test measures assessed students' progress on reading rate, word identification, and reading comprehension of sentences and passages. In addition, the PPVT-III was used to measure changes in receptive vocabulary from pretest to posttest. O'Connor, White and Swanson used hierarchical linear modeling with repeated measures to determine significant differences in level and growth between treatment conditions.

Results showed that students in all four groups made gains in overall reading performance during the 14-week intervention period with the average readers

outperforming the other three groups. The two treatment conditions showed significantly faster rates of growth and improvement over the control condition on measures of fluency, word identification, and passage comprehension. A high effect size of 1.0 was reported on measures of reading rate and reading comprehension in favour of the treatment conditions over the control conditions. However, there were no significant differences between the two treatment and control conditions on level of performance or growth estimates on measures of word attack and vocabulary; and no significant differences were found between the treatment conditions on measures of reading rate. In addition, no differences were found between the treatment conditions on measures of word identification, vocabulary, and comprehension and no differences were found between the second and fourth graders on reading outcomes as a function of age or grade. O'Connor, White and Swanson (2007) concluded that students in the treatment groups made "generalized gains in fluency" based on the results that students in the treatment groups reported gains in reading rate of over 20 wpm, whereas students in the control condition made minimal gains in reading rate (an increase of less than 5 wpm). The researchers found that gains in reading rate were associated with gains in comprehension at the sentence and passage level for the treatment groups. They claimed that the results of this study "do not rule out reciprocal causation between growth in fluency and comprehension" (p. 44), and of course neither do they support causation.

Their study is yet another example of an intervention with insufficient sample size and numerous variables and several varied conditions all of which severely restrict its usefulness for advancing a conceptualization of reading fluency. Regrettably, this study perpetuates the on-going lack of robustness in most studies in the fluency intervention

literature. The intervention research as a whole contributes very little clarity or insight to advance understanding of reading fluency. Thus, it seems that well-designed, controlled intervention research is as elusive as the construct of reading fluency itself.

The majority of intervention studies considered in my review measure reading fluency improvement using reading rate (calculated as words per minute) and/or word accuracy (calculated as words correct per minute). These two aspects of reading fluency happen to be the easiest dimensions to measure quantitatively. Very few studies examine the effects of reading fluency interventions on prosody or other component skills of reading because of the difficulty in finding valid and reliable measures. This narrow perspective places particular emphasis on two aspects of reading fluency which may or may not actually provide the most essential insight about a very complex, multi-dimensional construct. Moreover, there is a lack of complementarity between the definitions of reading fluency and the studies of reading fluency interventions. Intervention studies that do not adopt and/or build-on current definitions, add little, if anything, to the experimental literature.

CHAPTER 5: DISCUSSION, CONCLUSIONS, AND FUTURE DIRECTIONS

The purpose of this study was to undertake a critique of the theoretical construct, reading fluency through a systematic analysis and synthesis of the literature on the definitional and intervention research of the term. This critique was undertaken in order to establish a more consistent and complete understanding of reading fluency, the dimensions of reading fluency, and the reasons reading fluency is such an elusive construct of reading. The questions posed for my study are not mutually exclusive, and so some overlap is inevitable.

Discussion

Question 1: How is reading fluency defined and conceptualized in the reading and intervention research literature? Intervention studies between 1970 and 2007 examined the effects of particular approaches (primarily repeated reading) and surprisingly most adopted the more simplistic view of reading fluency featured in the definitions conceived prior to 2000 (see Table 1). In general, the intervention studies to date have focused on the effects of various types of reading practice used to enhance accuracy and automaticity of word recognition based on the premise that dysfluent reading is characterized by difficulties in the acquisition of effective and efficient word recognition and decoding (Chard, Vaughn, & Tyler, 2002; LaBerge & Samuels, 1974; Logan, 1997; Meyer & Felton, 1999). As a result, the intervention studies define and measure reading fluency in terms of word accuracy and reading rate for the most part. Furthermore, my analysis of the intervention research showed that only 3 of 93 reading fluency intervention studies (Dowhower, 1987; Herman, 1985; Kuhn, 2005) reflected a more complex view of reading fluency by measuring the effects of repeated reading interventions on dependent

variables including rate, accuracy, and prosody. Unfortunately, my analysis confirms that there is a lack of consistency and conformity between the more recent and complex definitions of reading fluency and reading fluency as it is represented and measured in the intervention research.

In general, there seem to be basically two distinct conceptualizations of reading fluency in the research literature. One perspective uses measures of accuracy and rate to determine reading fluency primarily because of the ease and efficiency of assessment. The alternative view incorporates prosody as fundamental to the conceptualization of reading fluency. However, the inclusion of prosody is problematic because of the lack of reliable measures to assess prosodic reading. Several researchers have raised concerns about the implications of perpetuating a narrow view of reading fluency focused exclusively on accuracy and automaticity of word recognition. Mathson, Allington, and Solic (2006) caution that a narrow definition of reading fluency measured as rate and accuracy has resulted in assessment and instructional practices which place too much emphasis on encouraging students to read text accurately and quickly with little to no attention on prosody or comprehension. Moreover, Hoffman, May and Sailors (2007) identified two competing conceptions of reading fluency in their review of the research literature: (1) the *automaticity view of reading fluency* focuses on accuracy and rate of reading, and (2) the *prosody view of reading fluency* focuses on the importance of reading rate, accuracy, and prosody as contributing to comprehension. They contend that the predominant perspective represented in current research and practice focuses on the automaticity view of reading fluency which ultimately narrows assessments and in so

doing moves further from responding to readers' needs. They cautioned that a narrow perspective of reading fluency has serious implications,

> We are troubled that these different views are not discussed openly in the literature but are hidden inside the illusion that theorists have reached some consensus on fluency. Further we argue that the shifting view of fluency toward automaticity is changing the nature of classroom assessments used to guide teaching in ways that were never envisioned in the early fluency research (p. 298)…the automaticity view of reading fluency is leading to assessments that are less than responsive to learner needs (Hoffman, May, & Sailors, 2007, p. 296).

In contrast, Pikulski (2006) offered a more optimistic perspective about the developments in the study of reading fluency. He maintained that, regardless of the limitations of the measures of reading fluency, the study of reading fluency entails the analysis of three dimensions in relation to reading comprehension,

> Little research is available to guide the assessment of fluency. Although the issues of adequate fluency rates at various grade levels and of judging the quality of oral reading need more research, good agreement currently exists about including measures of oral-reading accuracy, rate of oral reading, and quality of oral reading in the comprehensive assessment of fluency. Consensus is growing for assessing these dimensions of fluency within the context of reading comprehension. Fluency without accompanying high levels of reading comprehension is of very limited value" (pp. 90-91).

Although the conceptualization of reading fluency has evolved slowly over the last three decades, there have been a number of intriguing developments in recent years.

Two of the most notable include: (1) reading fluency most likely develops in stages and levels; and, (2) reading fluency is both contextual and situational. Pressley, Gaskins, and Fingeret (2006) argued, "…there are probably stages of fluency, with word-level fluency a precursor to fluent, constructively responsive reading, which varies in adequacy depending on the difficulty of the text for the reader…Constructively responsive fluent readers do not become fluent in an instant; there is no magical moment when fluency is achieved once and for all" (p. 47). These ideas are phrased in a tentative and hedged manner, note the usage of phrases such as "most likely", "there are probably stages of fluency" coupled with truisms about reading generally "reading fluency is both contextual and situational". Nonetheless, these ideas are fresh and worthy of further study. Moreover, it seems evident that reading fluency fluctuates in any given situation or context depending on a number of variables or factors both intrinsic and extrinsic to the reader: reading purpose; efficiency and automaticity of sight word recognition; text difficulty and structure of the text; decoding proficiency; background knowledge; use of reading strategies; regressions while reading; familiarity with content and vocabulary; attention and motivation (Hiebert, 2006; Pressley, Gaskins, & Fingeret, 2006; Samuels, 2006; Torgesen & Hudson, 2006). Stahl (2004) concluded that although accuracy, rate and prosody are important dimensions of skilled reading, they are not sufficient to ensure reading proficiency. He emphasized that a reader must understand the language and words in a text and be able to use reading strategies in order to construct meaning from the text. Therefore, reading fluency might be viewed as the process of consolidation of a number of reading subskills which serve to enable the ability to decode and comprehend

text simultaneously (Samuels, 2006). In conclusion, reading fluency at best seems to be an evolving theoretical construct at this time.

Question 2: What is it that is so unique about reading fluency? One reason that reading fluency remains so elusive may have something to do with the diverse perspectives and disciplines involved in the study of reading. In an historical account tracing the evolution of reading in the twentieth century, Pearson (2001) pointed out that there was considerable development in the conceptualization of reading between 1970 and 2000. The contributions from various disciplines with different theoretical paradigms (including linguists, psycholinguists, cognitive psychologists, sociolinguists, philosophers, literary critics, and critical theorists) resulted in major changes in reading curriculum and pedagogy, "Reading became an ecumenical scholarly commodity; it was embraced by scholars from many different fields of inquiry…the influence of these other scholarly traditions on reading pedagogy is significant" (p. 11). Pearson's account is also relevant to the evolution of reading fluency.

Contributions from two main disciplines have weighed in on the study and conceptualization of reading fluency; cognitive psychology and reading research. Cognitive psychologists have conducted extensive study of reading fluency in terms of accuracy and automaticity of word recognition using standardized measures of accuracy (words correct per minute) and reading rate (recorded as words per minute). In addition, they have examined fluency in relation to various processes and levels of development including: the coordination of internal processes (such as perceptual, phonological, orthographic, morphological); the integration of component subskills of reading at the letter, letter-pattern, and word level; and, the assimilation of semantic and syntactic

processes at the word and connected text level (Berninger et al., 2001; Kame-enui et al., 2001; Fuchs et al., 2001; Wolf & Katzir-Cohen, 2001). Reading researchers, on the other hand, have examined three main components of reading fluency including accuracy, automaticity, and prosody (Kuhn & Stahl, 2003; Mathson, Allington, & Solic, 2006) with prosody being a relatively new and additional focus. Even though reading fluency has been studied from multiple perspectives there remains a sameness to the definitions (accuracy and rate). It thus remains disconcerting that considering the number of studies and recent publications on reading fluency, no consensus on the definition of reading fluency is in sight.

Hoffman, May, and Sailors (2007) concluded, and I agree, "As a field, we should not hide behind the illusion that any attention to fluency is a good thing when differing views of fluency shape instruction in fundamentally different ways. The first step is for researchers to be clear in their use of terminology" (p. 301). I have come to the conclusion that reading fluency is a complex construct of reading with multiple layers and components, some of which seem intangible and difficult to measure. My emerging conclusion is that reading fluency holds remarkable similarity to the construct of proficient reading. This emerging conclusion causes me to wonder whether the goal of fluent reading is the same goal as that of proficient reading.

Question 3: What does it mean to read fluently? Discrepancy in the research persists about which dimensions contribute to reading fluency and which are outcomes of reading fluency. The main dimensions are word recognition or word accuracy, reading rate, automaticity, and prosody.

According to the literature, reading fluency entails recognition, identification and pronunciation of words in text. In the research literature, accuracy or word recognition is often contextualized in terms of rate, efficiency, or speed of word reading and measured as words read correctly on assessments of oral reading. However, it is important to note that although word accuracy is necessary and important to both reading fluency and comprehension, it is not sufficient to ensure either (Chard, Vaughn, & Tyler, 2002; Kuhn & Stahl, 2003). There are instances in which children can read accurately but do not understand what they have read (Paris, 1995; Pinnell et al; 1995; Stahl, 2004). Stahl (2004) suggested that word accuracy may become less important to reading fluency as the reader progresses to more advanced stages of reading development, "oral reading accuracy may be important only in the early grades, with other factors such as vocabulary and comprehension strategy use becoming important later on" (pp. 188-189). Closely related is reading rate measured in terms of the number of words read per minute. Many definitions of reading fluency emphasize that rate encompasses the automaticity of word recognition in terms of how quickly or efficiently the text is read. Measuring the number of words read *correctly* per minute is a combined measure of word accuracy and rate together. Similar to accuracy, reading rate is considered to be an integral component of reading fluency, however, it too is not the primary determinant of reading fluency (Kuhn & Stahl, 2003). There has been considerable discussion in the literature about the implications of encouraging readers to read faster. Topping (2006) warns of the implications of placing too much emphasis on reading rate,

> Fast reading, even if accurately decoded, does not always automatically result in good comprehension (although it is in general positively correlated with good

> comprehension). Students who assume that just because they can read words fast and accurately they are "fluent" readers may be on dangerous ground. Some so-called measures of fluency in widespread use reinforce this damaging fallacy by measuring only speed of accurate word recognition (p. 107).

Based on his research of skilled readers, Pressley (2006) contended, "'excellent reading' is anything but fast…(it) involves considerable reflection and reaction, sometimes rereading, and pausing to think about the images conjured by the text and the big ideas in the text" (p. 13). He suggested that word-level fluency or the ability to read words accurately and quickly was necessary for the reader to be able to control when to slow down and when to use comprehension strategies in order to construct meaning from text which is an indication that the reader has become a *constructively responsive fluent reader*. Automaticity has direct ties to efficient and effective word recognition. Harris and Hodges (1995) defined automaticity as "fluent processing of information that requires little effort or attention, as sight-word recognition" (p. 16). Several researchers have emphasized the importance of proficient word recognition to overall reading fluency. Stanovich (1980) stated, "fast and automatic word recognition is an important determinant of fluent reading" (p. 58). Consequently, if children are to become fluent readers, they need to successfully transition to the stage of automatic word identification in order to be able to negotiate and construct meaning from texts (Stanovich, 1980; Kuhn & Stahl, 2003).

Although automaticity is necessary for readers to be able to simultaneously decode and comprehend text (Samuels, 2006; Palumbo & Willcutt, 2006), automatic word recognition does not necessarily guarantee comprehension. Stahl (2004) reported

that there are some children who can read accurately, but do not necessarily understand what they have read. Yet another factor was advanced by Pinnell and her colleagues (1995) that some children do not read text automatically and fluently but still manage to derive meaning from the text.

Prosody, you will recall is a newcomer to the definition of reading fluency, and is defined as, "(1) the pitch, loudness, tempo, and rhythm patterns of spoken language; suprasegmental prosodic features (2) the study of the form and metrical structure of verse" (Harris & Hodges, 1995, p. 196). Torgesen and Hudson (2006) claim that the reason prosody has not been incorporated into most of the intervention research is because "prosodic features of oral reading are more difficult to reliably assess than are the features of accuracy and rate" (p. 136). Some of the key features of prosodic reading center on the syntactic and semantic structure of text including how words are grouped or 'chunked' into meaningful phrases (Dowhower, 1987, 1991; Kuhn & Stahl, 2003; Schreiber, 1980, 1991). The reader must draw upon their intuitive understanding of the syntactical and grammatical structure of language and how speech sounds in order to apply this knowledge to the context of reading. Torgesen and Hudson (2006) offered yet another interpretation of the prosodic features of language,

> Prosody is a linguistic term that describes the rhythmic and tonal aspects of speech: the "music" of oral language…These elements signal question, surprise, exclamation, and other meanings beyond the semantics of the words being spoken. When these features are present and appropriate in oral reading, the reader is reading prosodically or "with expression." Struggling readers are often

> characterized as reading in a monotone without expression or with inappropriate phrasing (p. 134).

It seems that the prosodic features mentioned are all related in some way to how 'smoothly' and 'expressively' a text is read and whether these suprasegmental features either serve to accentuate or interfere with the fluency and construction of meaning of the text. The debate about prosody centers on whether prosody is necessary for reading comprehension (Rasinski, 2004) or whether prosody is an indication or outcome of reading comprehension (Kuhn & Stahl, 2003; Torgesen & Hudson, 2006).

In the final analysis, we are still left with the question, what does it mean to read fluently? Although current definitions appear to encompass a broader and more complex view of reading fluency, there is still so much that we do not understand about the theoretical construct of reading fluency. Topping's (2006) comments capture some of the essence of the elusive nature of the multi-dimensional construct of reading fluency,

> Fluency is not an entity, a benchmarkable competence, or a static condition. Fluency is an adaptive, context-dependent process that can operate at a number of layers or levels (this is also true of comprehension). Even expert readers will show dysfluency when confronted with a text on an unfamiliar topic that provides challenge greatly beyond their independent reading level, however high that level might be. Fluency is of little value in itself – its value lies in what it enables (p. 106).

And yet, we know from the research reported herein that accuracy, rate, and prosody are necessary but insufficient to ensure reading proficiency.

Conclusions

I have made a number of key observations based on the definitional and intervention literature on the theoretical construct of reading fluency. They include:

1. There is no unified perspective on what comprises reading fluency. It is viewed variantly across disciplines and contexts.
2. The research has focused primarily on an isolated and fragmented study of discrete skills related to reading fluency including rate, accuracy, automaticity and prosody.
3. Although rate, accuracy, automaticity, and prosody may be considered necessary and important to overall reading fluency and competence in one way or another, none of these dimensions is the key factor of reading success. It remains unclear which of these dimensions contribute to reading fluency and which are a by-product of reading fluency. What is certain is that reading involves a complex array of skills and proceses that must all function in a coordinated manner.
4. The intervention research focused on improvement and measurement of specific aspects of reading fluency such as word accuracy and reading rate has shown neither beneficial effects on nor substantial gains in reading comprehension. The study of reading fluency as separate and distinct from reading comprehension is inadequate for explaining how readers' rate, accuracy, automaticity, and prosody help a reader to construct meaning from text. The study of reading fluency must move towards understanding how the aspects of reading fluency contribute to reading comprehension, if in fact, they are unique processes.

My investigation of reading fluency has clearly shown a lack of agreement about precisely what distinguishes reading fluency from reading proficiency. The term, reading fluency is useful only when it has explanatory power to communicate a clear and consistent message. Moreover, its value and usefulness diminishes when its meaning changes from context to context and when it is defined one way and measured another.

The critical question motivated by my study is whether the defining components of reading fluency are sufficiently unique to necessitate a discrete theoretical concept. In other words, is reading fluency comprised of such distinguishing features that it warrants the use of a term which is separate and distinct from other constructs of reading, namely, proficient reading? To address this question, it is important to consider whether the goal of reading fluency would differ significantly from the goal of proficient reading. If the goal of reading is to increase accuracy and rate, then use of the term, reading fluency might hold some import. However, if the goal of reading fluency is the construction of meaning from text, which I believe it is, then reading fluency may not necessarily be a separate construct from proficient reading.

There is some indirect support for my conclusion, Pikulski (2006) noted a reciprocal relationship between decoding and comprehension, "fluency is manifested in accurate, rapid, expressive oral reading and is applied during, and makes possible, silent-reading comprehension" (p. 73). This conceptualization seems to suggest that the definition of reading fluency and proficient reading are fundamentally one and the same. The current research characterizes the essential characteristics of reading fluency as decoding and comprehension; and the secondary characteristics or indicators of reading

fluency as speed, accuracy and expression (Riedel, 2007). It is known that these characteristics are not necessarily unique to reading fluency.

Although the dimensions of word accuracy, rate, automaticity, and prosody are considered by some to be fundamental to reading fluency, they are also considered essential aspects of proficient reading, all of which contribute to the construction of meaning from text. For the most part, studies of accuracy, rate, or, prosody have not resulted in gains in comprehension. The research on reading fluency focused on teasing apart these dimensions serves only to raise more questions. If the ultimate goal of reading is comprehension, then any attempt to isolate particular dimensions, or aspects, of reading ultimately falls short of comprehension. Based on my investigation of the research, the goal of reading fluency and reading proficiency seem virtually indistinguishable as both focus on one primary goal -- reading with understanding. Thus, the current research on reading fluency does not provide sufficient evidence to warrant a distinction between reading fluency and reading proficiency.

The bottom line is that there is little purpose in perpetuating the use of a term which provokes confusion. To address the current quagmire, I propose that it may be necessary to abandon the term reading fluency altogether in order to attain a better grasp of the specific dimensions of reading that are fundamental to the construction and interpretation of meaning from text.

Limitations

Although I reviewed considerable research literature on reading fluency, my study is far from exhaustive, complete, or conclusive. Generally, the intervention research contributed very little insight to advancing the conceptualization of reading fluency as it

tended to focus on measures of reading fluency which were quick and easy to administer. In addition, the intervention research on reading fluency includes poorly designed studies confounded by a host of problems including limited conceptual frameworks, lack of specificity, small sample sizes, and lack of robust experimental designs. Thus, in part, I have to acknowledge that what I have learned is only as good as the research it is based on. The inclusion of in-depth qualitative and hybrid studies may have pointed to a better understanding of the problems faced by individual children in specific reading contexts.

Future Directions

My study has shown that there are many questions that remain unanswered. The first and most important development needed is a unified definition of reading fluency. Reading fluency may need to be defined differently for students at different stages of reading development. At the early stages of reading development it seems that reading fluency depends more on word accuracy, rate and automaticity than it does at later stages of reading development. However in the later stages of reading development, reading fluency seems to depend more on other aspects of reading including vocabulary, comprehension strategies, and prosodic features. The definition of reading fluency may need to account for these differences. Some specific research questions include:

1. Are there differences in how we assess and measure progress in reading versus how we measure gains in reading fluency? What would those differences look like?
2. What, if anything, differentiates proficient reading (i.e., good reading) from fluent reading? What would constitute such differentiation?

3. What is the role of each aspect of reading fluency (accuracy, rate, automaticity, and prosody) in overall reading proficiency?
4. What is the relationship between reading fluency and reading comprehension? What is the relationship between and amongst the various aspects of reading fluency including reading rate, word accuracy, and prosody? What is the relationship between the aspects of reading fluency and comprehension? How does each aspect of reading fluency interact with comprehension to make up good reading?
5. What measures of oral reading fluency are needed to establish a profile of student growth in reading in order to provide useful information for making instructional decisions to improve overall reading competence?
6. How does reading fluency develop over time? How can development of reading fluency be traced? What assessments of oral reading fluency contribute to understanding of the reading process and development, and can serve as an index of reading acquisition over time?

I also query the situational and contextual nature of fluency. If fluency fluctuates for every reader depending on the context and situation, and regressions or interruptions in the flow or fluency of reading are considered to be purposeful and constructive, then what definition and measure of reading fluency would provide this kind of deeper, and more comprehensive view? I wonder how variables like text difficulty, vocabulary knowledge, background knowledge, and familiarity with the content affect reading fluency. Future research has to focus on more meaningful approaches to the assessment of reading fluency in order to encompass a more complex view of reading fluency and

use reliable and valid measures consistent with the theoretical literature. And, finally there is a need for more controlled and qualitative studies to examine which reading fluency interventions are most appropriate, if any.

Table 1

Definitions, or Descriptions of Reading Fluency from 1981-1999

Researchers / Publication Year	Definition, or Description	Dimensions or Aspects of Reading Fluency: Component subskills of reading	Reading rate / speed	Word accuracy or decoding	Automaticity: Explicit	Automaticity: Implicit	Prosody	Comprehension
Harris & Hodges (1981)	Fluency is defined as the "freedom from word recognition problems which might hinder expression of ideas during oral reading" (p.120)			✓*				
Schreiber (1991)	"...oral reading fluency...can be characterized as smooth, expressive production with appropriate phrasing or chunking in accordance with the syntactic structure of the material being read" (p. 158)..."Fluent oral reading, then, can be described as production with syntactically appropriate pauses, intonation contours, and phrase-final lengthenings" (p. 161).						✓*	
Zutell & Rasinski (1991)	"...in fluent oral reading, (a) the reading appears fairly effortless or automatic, (b) readers group or "chunk" words into meaningful phrases and clauses, and (c) readers use pitch, stress, and intonation appropriately to convey the meanings and feelings they believe the author intended" (p. 212).				✓*		✓*	
Harris & Hodges (1995)	"Fluency is defined as the "freedom from word recognition problems that might hinder comprehension in silent reading or the expression of ideas in oral reading; automaticity" (p.85)			✓	✓			✓
Meyer & Felton (1999)	Fluent reading is "the ability to read connected text rapidly, smoothly, effortlessly, and automatically with little conscious attention to the mechanics of reading, such as decoding...fluent reading allows the reader to attend to the meaning of text rather than to the mechanics of reading (Samuels, 1979; Adams, 1990)" (p. 284).		✓		✓*			✓*

* most salient feature emphasized

Table 2

Definitions, or Descriptions of Reading Fluency from 2000-2006

Researchers / Publication Year	Definition, or Description	Dimensions or Aspects of Reading Fluency: Component subskills of reading	Reading rate / speed	Word accuracy or decoding	Automaticity: Explicit	Automaticity: Implicit	Prosody	Comprehension
Report of the National Reading Panel (2000)	"Fluency (is the) ability to read text quickly, accurately, and with proper expression..." (p. 3-5)		✓	✓			✓	
Hudson, Mercer & Lane (2000)	"Fluency involves accurate reading at a minimal rate with appropriate prosodic features (expression) and deep understanding" (p. 16)		✓	✓			✓	✓
Kame'enui et al (2001)	These authors proposed to "explore and expose the critical and changing role of fluency in the development of the component foundational skills in beginning reading, including phonological awareness (e.g., phonemic segmentation), alphabetic understanding (e.g., knowledge of how sounds and letters related and their primary role in word recognition), word recognition, and comprehension...the value of fluency is not limited to reading connected text quickly and accurately. Instead, it incorporates the development of the component skills of beginning reading such as phonemic awareness and letter-sound association, and the need for a high criterion level of proficiency. Moreover, it is predicated on the proposition that fluent performance of complex skills and higher-level processes (e.g., word recognition and reading comprehension) requires fluency in the component skills and lower-level process" (p. 308).	✓*						✓*
Berninger et al (2001)	Fluency requires efficiency and automaticity of multiple internal processes including phonological, orthographic, and morphological systems. "...fluency is a multi-dimensional concept, which may operate differently at the word, sentence, and text levels. We propose that automaticity is most relevant to direct access and retrieval of single lexical items from the mental lexicon, whereas executive coordination is most relevant to the sentence level in which words are serially ordered according to syntax and should be read aloud in a manner that reflects prosody of the language (phrasing, stress expression, pitch, juncture, and intonation). Executive coordination also applies to the orchestration of multiple language processes, not just lexical access...Not all fast processing is automatic." (pp.. 396-397).	✓*			✓			

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Table 2 -Continued

Definitions, or Descriptions of Reading Fluency from 2000-2006

Researchers / Publication Year	Definition, or Description	Dimensions or Aspects of Reading Fluency: Component subskills of reading	Reading rate / speed	Word accuracy or decoding	Automaticity: Explicit	Automaticity: Implicit	Prosody	Comprehension
Wolf & Katzir-Cohen (2001)	"In its beginnings, reading fluency is the product of the initial development of accuracy and the subsequent development of automaticity in underlying sublexical processes, lexical processes, and their integration in single-word reading and connected text. These include perceptual, phonological, orthographic, and morphological processes at the letter, letter-pattern, and words levels, as well as semantic and syntactic processes at the word level and connected-text level. After it is fully developed, reading fluency refers to a level of accuracy and rate where decoding is relatively effortless; where oral reading is smooth and accurate with correct prosody; and where attention can be allocated to comprehension" (p. 219).	✓*	✓	✓	✓*		✓	✓
Fuchs et al. (2001)	"Our proposition is that oral reading fluency represents a complicated, multifaceted performance that entails, for example, a reader's perceptual skill at automatically translating letters into coherent sound representations, unitizing those sound components into recognizable wholes and automatically accessing lexical representations, processing meaningful connections within and between sentences, relating text meaning to prior information, and making inferences to support missing information. That is, as an individual translates text into spoken language, he or she quickly coordinates these skills in an obligatory and seemingly effortless manner, and because oral reading fluency reflects this complex orchestration, it can be used in an elegant and reliable way to characterize reading expertise" (p. 239-240)	✓*			✓*			✓*
Johns & Berglund (2002)	"Reading fluency is the ability to read with accuracy, expression, comprehension, and appropriate rate...think of fluency as having four components: speed, accuracy, appropriate expression, and comprehension." (p. 3)		✓	✓			✓	✓
Rasinski (2004b)	"Successful reading requires readers to process the text (the surface level of reading) and comprehend the text (the deeper meaning). Reading fluency refers to the reader's ability to develop control over surface-level text processing so that he or she can focus on understanding the deeper levels of meaning embedded in the text. Reading fluency has three important dimensions that build a bridge to comprehension...accuracy in word decoding...automatic processing...prosodic reading" (p. 46).		✓	Implied (✓)	✓		✓	✓

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Table 2 -Continued

Definitions, or Descriptions of Reading Fluency from 2000-2006

Researchers / Publication Year	Definition, or Description	Component subskills of reading	Dimensions or Aspects of Reading Fluency: Reading rate / speed	Word accuracy or decoding	Automaticity: Explicit	Automaticity: Implicit	Prosody	Comprehension
Pikulski & Chard (2005)	Reading fluency refers to efficient, effective word recognition skills that permit a reader to construct the meaning of text. Fluency is manifested in accurate, rapid, expressive oral reading and is applied during, and makes possible, silent reading comprehension (p. 510).		✓	✓		✓	✓	✓
Hudson, Lane, & Pullen (2005)	Fluent reading comprises three key elements: accurate reading of connected text at a conversational rate with appropriate prosody or expression (Hudson, Mercer, & Lane, 2000). A fluent reader can maintain this performance for long periods of time, can retain the skill after long periods of no practice, and can generalize across texts. A fluent reader is also not easily distracted and reads in an effortless, flowing manner (p. 702).		✓	✓		✓	✓	
Allington (2006)	"...fluency is reading in phrases, with appropriate intonation and prosody – fluency is reading with expression" (p. 94).						✓*	
Deno & Marston (2006)	"We understand reading fluency to mean an individual easily processes text and that the processing of text encompasses both word recognition and comprehension" (p. 179).			✓		✓		✓
Hiebert (2006)	In fluent reading, word recognition is sufficiently automatic and accurate so that a reader's attention is focused on the meaning of the text (LaBerge & Samuels, 1974; Samuels, 2002) (p. 207). Oral-reading fluency is a fairly robust proxy for silent-reading comprehension (Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993; Pinnell et al., 1995). However, because reading is typically a silent act, automaticity and accuracy in silent reading, not oral reading, is the ultimate goal" (p. 207).			✓*	✓*			✓
Palumbo & Willcutt (2006)	These authors subscribe to the definition from the NRP which incorporates word recognition and comprehension in the conceptualization of reading fluency. They state, "to be considered fluent, the reader must decode and comprehend simultaneously" (p. 160).			✓				✓

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Table 2 -Continued

Definitions, or Descriptions of Reading Fluency from 2000-2006

Researchers / Publication Year	Definition, or Description	Dimensions or Aspects of Reading Fluency: Component subskills of reading	Reading rate / speed	Word accuracy or decoding	Automaticity: Explicit	Automaticity: Implicit	Prosody	Comprehension
Pikulski (2006)	"Reading fluency is a developmental process that refers to efficient, effective decoding skills that permit a reader to comprehend text. There is a reciprocal relationship between decoding and comprehension. Fluency is manifested in accurate, rapid, expressive oral reading and is applied during, and makes possible, silent-reading comprehension... Fluency is equally or, perhaps more importantly, simultaneously grounded in the systematic development of decoding skills and language vocabulary skills" (pp. 72-73).		✓	✓		✓	✓	✓
Pressley, Gaskins, & Fingeret (2006)	"...we want readers to read words fast and accurately and with expression (i.e., read prosodically), but we want more. We want readers also to read with high comprehension, and for that to happen, we are convinced that they must be constructively responsive as they read (Pressley & Afflerbach, 1995)... Speed in reading and accurate word reading are not the goals. Understanding, appreciating, and thinking about the ideas in text are. Yes, fluency at the word level, as operationalized as reading accurately and quickly, is necessary so that the reader can choose to slow down and employ the comprehension strategies previously described. When word-level reading is fluent, enough cognitive capacity is available (LaBerge & Samuels, 1974) to permit the decision to execute the comprehension strategies and profit from them. Thus, fluent readers can and do think hard about what they are reading. Constructively responsive fluent readers do not become fluent in an instant; there is no magical moment when fluency is achieved once and for all. Moreover, even a presumably fluent, proficient adult reader might falter if presented with a very difficult and unfamiliar text. Thus, there are probably stages of fluency, with word-level fluency a precursor to fluent, constructively responsive reading, which varies in adequacy depending on the difficulty of the text for the reader" (Pressley, Gaskins, & Fingeret, 2006, p. 47).	✓	✓	✓	✓*		✓	✓*
Rasinski (2006)	"Fluency essentially deals with the surface-level and easily observable aspects and characteristics of reading – it deals largely with oral reading , it deals with reading words accurately and with appropriate speed, and it deals with embedding in one's voice elements of expression and phrasing while reading...However, reading at its heart, involves comprehension...Comprehension requires the mastery of surface-level aspects of reading." (p. 18)		✓	✓			✓	✓

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Table 2 -Continued

Definitions, or Descriptions of Reading Fluency from 2000-2006

Researchers / Publication Year	Definition, or Description	Dimensions or Aspects of Reading Fluency: Component subskills of reading	Reading rate / speed	Word accuracy or decoding	Automaticity: Explicit	Automaticity: Implicit	Prosody	Comprehension
Samuels (2006)	"Using automaticity theory as the basis for the definition, reading fluency is defined as the ability to decode and comprehend at the same time. However, fluency is situational.... Other behaviors such as oral reading with speed, accuracy, and expression are simply indicators of fluency...The ability to decode and comprehend at the same time is profoundly important to understanding how to determine if a student is fluent...the critical test of fluency is the ability to decode a text and to understand it simultaneously" (p. 39-40).		✓	✓*	✓*		✓	✓*
Topping (2006)	"Fluency is not an entity, a benchmarkable competence, or a static condition. Fluency is an adaptive, context-dependent process that can operate at a number of layers or levels (this is also true of comprehension)" (p. 106) "For silent reading, fluency is defined by this author as the extraction of maximum meaning at maximum speed in a relatively continuous flow, leaving spare simultaneous processing capacity for other higher order processes. This definition assumes the text is at an appropriate level of difficulty for the reader" (p. 107). "For reading out loud, the task – and therefore the definition – is more demanding because among the higher order processes, the reader must have an awareness of audience needs and the capability to manage the prosodic demands for expressiveness (varying phrasing, stress, intonation , pitch, rhythm, loudness, pauses, etc.)" (p. 107).		✓	Implied (✓)		✓	✓*	✓*
Torgesen & Hudson (2006)	Fluent reading comprises three key elements: (1) accurate reading of connected text, (2) at a conversational rate, (3) with appropriate prosody (Hudson, Mercer, & Lane, 2000). A fluent reader can maintain this performance for long periods of time, retains the skill after long periods of no practice, and can generalize across texts. A fluent reader is also not easily distracted and reads in an effortless, flowing manner (p. 133)		✓	✓		✓	✓	

* most salient feature emphasized

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